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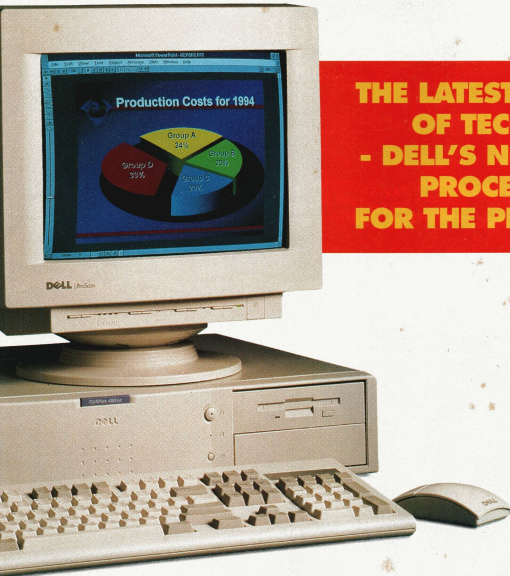
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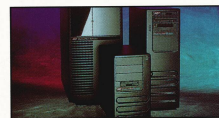
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Sleigh riding



Bill Gates would enjoy being Santa Claus. Santa has near simultaneous access to every home on the planet. He's the only major player in his market. He's got global penetration, high brand identification, a great media image, and an ubiquitous PR department with a strong shop-front presence. His workforce is eccentric but well respected. It includes some of the brightest sparks on the planet, and some of them can work magic, although they're all clearly lesser in stature to their boss. Santa always ships on time, and his products don't require technical support. No one accuses Santa of megalomania or of being on a quest for world domination. He lives somewhere that's way cool. He's got carefully colour-coordinated clothes. And he's never got a speeding ticket.

Everybody loves Santa. Most of us are deeply suspicious of Bill Gates.

Personally, I'd like to see how his PC was setup. I'd like to know whether he runs Windows NT Workstation 3.5 or the Win95 Beta 2. What's his favourite notebook? What non-Microsoft software does he use? What macros has he got in Excel and Word? How many of them did he write himself? What approach does he take to drive housekeeping? How many emails does he send a day? What are his favourite Web sites? How does he keep up with newswires and what magazines does he read?

Why do I want to know this? Surely *APC* is not resorting to *Who Weekly*-style personality journalism? No. These are essentially technical questions: What environment do I use and how do I manage the information coming into it? Bill Gates, like him or lump him, will do much to determine the future usage of computing. He's one of the few individuals left who will. The formative figures of the personal computer industry have passed on. There's still Philippe Khan, and there are still plenty of small startups, like Netscape, doing really amazing stuff, but most of the PC big names that started off driven by the imaginations of guys with great ideas are now run by managers, like Novell's Frankenburg or Intel's Andy Grove, rather than the tech-heads who gave them birth.

At the same time, the relationship of these companies with the public is changing. The word "stuff" is an interesting example. Microsoft's new TV ads start off "this stuff we make, it's powerful". No big deal. But Microsoft itself thinks it is. It invited, and managed to draw along, most of the editors of Australia's myriad of computing publications to what was, in effect, a preview of their ads.

The bemused pack left deflated. We expected, no doubt unreasonably, a broad outline for Microsoft's technology strategies for the next five years. Instead we got an ad.

But maybe we did get what we came for. John Treloar told the seminar that these ads signalled a major shift for Microsoft, away from advertising products and technologies, to advertising its brand.

Similarly, *APC*, the country's top selling computer magazine, has been unable to secure a Bill Gates interview. Meanwhile, the November 12 *Weekend Australian's* Review lead article was a "new journalism" interview with Gates. This bothered to use only a handful of direct quotes and concentrated on the author's impressions and feelings towards Gates and his company, rather than on what Gates had to say or his work.

Microsoft is basing its future on public perceptions and feelings, rather than on catering to technology enthusiasts. It's all ubiquity's fault — and it makes a helluva lot of sense. Gates sees a PC in every travel bag and in every living room. Appealing to everyone requires a different form of public relationship to appealing to people with a natural enthusiasm for technology.

But there's a danger in this. Personal computing has been driven by the synergy between users and developers. In its earliest days, but even to a degree still, the two groups have high crossover, and high cross fertilisation.

Bill Gates is generalised about more than anyone but Santa. But this is because in many ways he is similar. He's used symbolically. In this case it's by the media to represent the software industry and the rise of personal computing. Hence the cultivation of the nerd factor, and the cult of Bill.

We have to be careful, as computing moves into every home and travel bag, that we aren't overly captivated by the magic and symbolism.

Merry Christmas,

Jeremy White
Editor (Acting) *APC*

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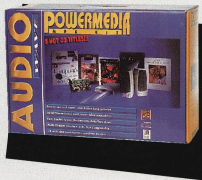
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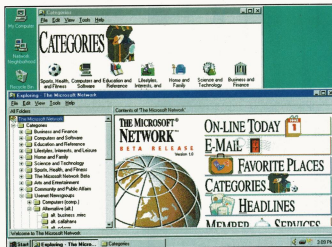
Bill Brother is watching you

Microsoft will bundle point and click access software to its new Microsoft Network (MSN), previously codenamed Marvel, with Windows 95 when it ships in the first half of the new year. Local access will be provided through "On Australia", a joint venture between Microsoft and Telstra.

The service was introduced last month by the triumvirate of Microsoft's head of advanced technology, Mr Daniel Petre, the head of Telstra, Mr Frank Blount, and the Minister for Communications and the Arts, Mr Michael Lee.

Admitting that he still didn't know what a "chat session" was, Mr Lee told the assembly, "we realise the much talked about information superhighway might be much closer than we think. In the immediate future it will be narrowband communications over the existing network."

"But much more important than the technology is the content," according to Mr Lee. "If we bring together the best of our creators and software



MSN's Australian users will initially access US-based servers

designers we can create many export dollars for Australia."

While access charges for the new service haven't been set yet, Microsoft's long term intention is clearly to make cash from the revenue stream generated by commerce flowing across its network, rather than through access charges and fees. This is a long term proposition.

MSN is likely to debut at or below the price point of com-

petitive products around the globe. Also, according to local officials, there will be no cost penalty for users in Australia in the form of network access charges above those paid by US subscribers. Microsoft has even raised the possibility that time online will become free sometime in 1996.

Concurrently, Microsoft is likely to offer content providers higher returns than

Continued on page 12

News roundup

● It is becoming clear that Notes' biggest competitor is Mosaic, not Microsoft's groupware enabled applications suite. Microsoft has made the running for the last couple of years. Bill Gates put forward the idea that "groupware" should be integrated into applications. Microsoft also followed a strategy of modifying its mail server to incorporate Notes-like features. We are still waiting for the final implementation of this strategy. Meanwhile, Lotus sailed on with Notes doing better and better in the market. It has been ported to a number of Unix platforms and work is underway to make it suitable for use on the Internet. Then the reports started to come in of the large scale Unix sites that were using Internet-developed data storage and retrieval software for their own internal information processing systems. More and more were turning to Mosaic, the engine behind most of the World Wide Web sites on the Net. Of course Mosaic will never replace the corporate database. However it can do much the same job as Notes in handling large volumes of free form text and images. It solves the replication problem not by copying data but by pointing to it. This approach relies on the network being reliable but keeps the data more up-to-date than Notes replication (see also World Wide Notes page 30).

● Old word processors never die they just turn up in suites. Or at least WordStar hasn't died yet. It is going to become part of Corel's new suite for Windows 95. Ironically, Corel is planning to use WordStar for Windows 2 as part of a 32-bit suite the company says it will have ready next year when Windows 95 ships. Is a word processor that traces its pedigree back to 8-bit CPM really 95 ships? We will see next year. And speaking of Windows 95, the operating system wars are on again. IBM has put out its new version of OS/2, Warp. Unfortunately the earliest copies were plagued by a bug that prevented the operating system from installing correctly. IBM is saying that only a few hundred copies were sent out with the bug. The most talked about feature in the new operating system is its Internet access. This will use IBM's

COMDEX highlights

It was the battle of the operating systems at Fall COMDEX 94, in Las Vegas, Nevada. IBM and Microsoft took centre stage boasting products and capabilities of their respective operating systems.

IBM demonstrated its just-released operating system, OS/2 Warp, and received the support of multiple third party vendors. The company gave users a sneak preview of OS/2 for the PowerPC with more than a dozen demonstrations of pre-release code running productivity applications, games and development tools. OS/2 for the PowerPC will be commercially available next year.

IBM also introduced a beta test program for a LAN client version of OS/2, and is offering users tools with which to migrate applications from Windows to Warp. The client will allow OS/2, Windows, Windows for Workgroups and DOS applications to run on the same desktop.

Also, a slew of new IBM products and product enhancements was revealed at the show. A newly designed IBM PC 300 and 700 family, a new Aptiva line of home PCs, the latest additions to the ThinkPad mobile computers, IBM PC Server 500 enhancements and recently expanded HelpWare services were announced.

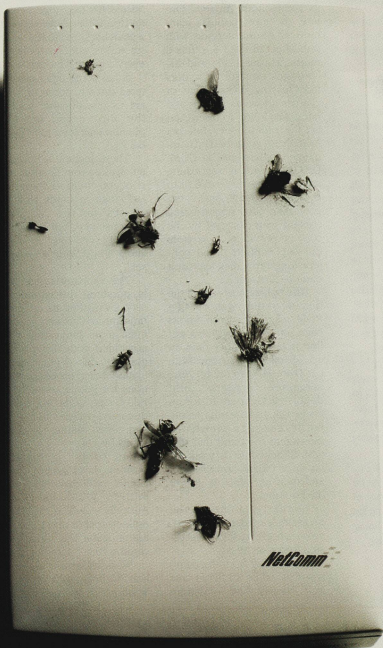
Microsoft flaunted its new Windows 95 system as well — more than 110 applications from companies such as Hewlett-Packard, Advanced Micro Devices and Texas Instruments were on display at the show. And while Windows 95 third-party vendors showed their wares, more information was provided to users regarding Microsoft's new on-line service.

Microsoft chairman and CEO Bill Gates detailed the company's strategy to succeed in the marketplace with The Microsoft Network, previously coined

Continued on page 16

**NO-ONE
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NetComm seems to make a habit of being conspicuously out in front with product innovation. For example, NetComm is again first to release an Australian designed and manufactured V34 modem—the world's

new high-speed dial-up modem standard. Furthermore, the NetComm M34F features 16-bit processor technology which gives it incredible data throughput capabilities. So if paying an enormous quarterly sum to the

telephone company bugs you, the answer is simple. Rush out and buy a NetComm.

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News roundup

worldwide network to link into the Internet. The Australian end should be partly in place by the time you read this.

● AMD and Cyrix are building new microprocessors to compete with Intel's Pentium. However, there is a new twist. The two companies are banking on the fact that software developers wait years to take advantage of the advanced features in new microprocessors. So for example, special features built into the 486 to allow developers to build operating systems that can make optimum use of multiple processors are only now being used in commercially available software. This means that there is a window for microprocessors that maintain compatibility with existing 386 and 486 chips but are not compatible with the Pentium. AMD and Cyrix hope that their new K5 and M1 processors will win market share by being faster than the Pentium.

The two companies already have some large computer suppliers ready to use the new chips. The trouble for the two chip makers is that PC makers are looking to squeeze Intel on price. They will have no loyalty if the going gets tough.

● It looks like Apple and IBM have finally got their act together on the PowerPC platform. An agreed common architecture will be released in the first half of next year. Things are looking brighter on the compatibility side. **Jeremy Horey**

Bill Brother is watching from page 9

its competitors. America Online, the most popular commercial online service with publishers in the US, offers a return of around 20%, and discourages content providers from levying subscriptions or charges above its own access rates. According to discussion on the online-news Internet mailing list, and based on comments by Bill Gates at COMDEX, Microsoft is negotiating returns of around 50 to 60% to content providers, and is encouraging subscription-based content with costs set by the content providers. It is from this subscription based content long term that Microsoft plans to turn a quid.

The publishing focus of the demonstration was on CD-ROM magazines with hooks back into the publisher's online presence, rather than an actual online publication. With a CD-ROM version of *Juice* magazine, readers could double-click on an ad for an Oxford T hairdressing salon, but this invoked a forms based messaging front-end that tied with MS Schedule+ to work out an appropriate appointment and then use MSN to deliver the booking.

Similarly, going to the magazine's readers' forum invokes a hook back to a discussion forum on MSN.

Our feeling from the demo was that, while it offered that and clearly had real-time

capacity, the core of MSN is Microsoft's Exchange rich text and forms-based messaging. It's a giant back-end to the universal inbox concept built into every copy of Windows 95.

It has some other neat features though, some of which are of questionable value in the short term, but have phenomenal long term potential.

These include "shortcuts", much like a combination of the concepts behind hypertext, DocLinks in Lotus Notes or aliases on the Mac. Not demonstrated, but apparently planned, are Internet access and a World Wide Web browser.

The company is aggressively pursuing the commercial services market. Its recent acquisition of Quicken becomes even more interesting when combined with this platform geared to deliver not just information, but to process transactions for goods and services. Bill Gates' COMDEX speech discussed people buying food and coffee online. He clearly wants his cut.

Microsoft's manager of business development, Al McGinnis, said that there are 3 million Windows PCs in Australia, of which 754,000 are online-capable, and 112,000 online in some way already, including 70,000 Internet users.

Worldwide there are 40 million PCs being sold a year, and Windows 95 will sell as many

copies next year. Microsoft expects 2 million PCs to be online in Australia alone. CompuServe worldwide claims just 3 million now.

While the technical issues arising from putting this many people online are huge, far more important are the anti-trust principals involved. When questioned on why Telstra was going with Microsoft rather than a local developer such as Oz-Email, Frank Blount said that other services were proprietary, and Telstra had learnt with Discovery not to be proprietary. Bill Gates himself argues that bundling MSN with Windows-95 is not anti-trust, because people can and will install other online services and MSN does not preclude their use, it would rather increase the entire market. "We don't think this is anti-competitive at all," he told COMDEX.

According to Michael Lee, government interference should be kept to a minimum. Having reached agreement once with the US Justice Department, Microsoft may well find itself back in negotiations. Just how great an endorsement the Federal Government and Telstra have given Microsoft remains to be seen, as does the effect it will have on local access providers such as Oz-Email, or even on well established players such as CompuServe Pacific. **Jeremy White**

Creative vision for Australia's future

Australia's own superhighway took a step along the road to being a virtual mardigras with the release of the government's long awaited cultural policy, *Creative Nation*, in October. While in parts the policy statement shows signs of technophobia, painting a picture of an indigenous culture awash on a tide of info-borne global space junk, it nevertheless demonstrates a clear understanding of the opportunities offered by information technology as the back end to the delivery of more of our own drama and music endeavours, both to greater numbers of Australians and as an avenue of revenue-generating export. The policy, maybe for the first time at

government level, has ascribed an economic value to the further development of culture in Australia, defining therein a potent export opportunity.

The marriage of the portfolios of Arts and Communications under former engineer Michael Lee earlier this year signalled the government's clear understanding of the wider potential that lay in combining them. There is a synergy between the technological revolution and the arts which must be met with imagination and wit, the policy states, and its emphasis is firmly on the opportunities offered by existing and emerging technologies, to more widely broadcast the

arts, with the dual agendas of greater public access and domestic and export revenue opportunities.

To support technology development the government announced that it would apportion \$84 million over five years to a multimedia development fund, and to projects which would allow the transfer of cultural endeavours to the medium.

Technologists, such as Microsoft's Daniel Petre, have expressed their absolute enthusiasm for the Keating passion for technology (see "Consumer computing" feature on page 92). When he spoke to APC, Mr Petre was keen to redress the balance of some comments that he had

made at an AIIA forum which he said had been taken out of context. "The comments I made about a lack of excellence in this country as far as multimedia development were not to disparage the government's initiative. It can only be good if the government gets right behind it. What I'm saying is that per capita the number of titles released in Australia is so far fewer than in the US we are still desperately behind. Microsoft in Australia has been looking for projects to support for almost a year and the quality is not like what we would expect, or consider world class standard."

Helen Dancer

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Australian pilot programs into wireless computing and the nascent area of PDAs have joined the growing flurry of interest and investment in China. Scribblemail, based on Newton PDA architecture, and jointly under development by Apple Australia and the newly established research facility, the Apple Pacific Centre of Excellence, is being trialled in the burgeoning Chinese marketplace. Scribblemail allows messages to be transmitted just as they are written, without the need to be translated into formalised text. A similar endeavour is being trialled in India, where the need is for health care services on the run. The Indian trial follows on the recent adoption in Australia of PDA-based health care applications by the Blue Nurses home care nursing association of Queensland.

Both countries have been the subject of a great deal of interest and investment, both in the area of information technology and media, with Rupert Murdoch recently wooing the Chinese government on the issue of information exchange with the country's most widely read newspaper *People's Daily*. The deal will see News Corp providing economic information for the newspaper, which is read by three million people every day, and is widely considered to be the mouthpiece of the communist government. It is oil on the waters for a relationship made rocky by a broadcast on Star TV, owned by Mr Murdoch, which explored the sexual peccadilloes of the late and much revered Chairman Mao Zedong. Offended, the government retaliated by closing down satellite sales, which Star relies upon to reach its Chinese audience.

The Australian Financial Review has followed suit with an agreement in August to

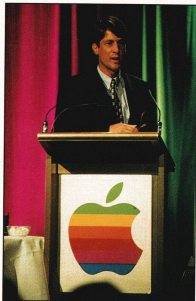
trade information with the *Economic Daily*—the official Chinese language newspaper.

On the IT front, Microsoft, also learning the lesson of not offending, has announced that it will work with China's Great Wall Electronics to improve the company's Chinese version of Windows, and is negotiating with the Ministry of Electronics to develop a Chinese version of Windows 95. The software giant had earlier angered the government by introducing a version of Windows 3.1 which had been developed in Taiwan. Lack of mainland involvement was criticised and there were rumours that the product had been banned. Success in both applications and system software is expected to return Microsoft annual revenues of close to \$US200 million over the next two or three years. The biggest stumbling block in this fastest growing market is, however, piracy, which accounts for a far larger proportion of Microsoft applications installed in China than actual legal licences. While the country is making progress on its copyright laws, enforcement remains a major problem.

Hardware manufacturers are also concentrating their endeavours to reach the fastest

The biggest stumbling block in this fastest growing market [China] is piracy

growing market in the world. Compaq announced in September that it will add warehousing and customer support to its existing commitment, a \$US5 million manufacturing plant in Shenzhen. The factory is expected to turn out up to 100,000 units in the first year, according to CEO Eckhardt Pfeiffer. Unlike other centres around the world



Scribblemail trials in China are based on PDA architecture. Messages are transmitted just as they are written.

which ship to other countries, production from the China plant will go almost totally toward satisfying the local market, a tangible indicator of the company's analysis of the size of the prospective market. The venture puts the company almost equal with AST, which has manufacturing facilities in Hong Kong and a strong presence in China, and recently announced that it too would increase manufacturing and open a second site near Beijing.

Demand in China is for the same products as any beginner market, says Compaq Australia's Inge Fugelvested. "Prolines, and a lot of server products. The early adopters in China are the same as those the world over; large corporates such as the banks and insurance companies, and especially the government. There's no such thing as a home market in China, yet. We haven't talked about releasing the Presario range there."

IBM is following a dual hardware/software approach

for its expansion into China, and claims its presence there will double this year and next. At a conference in October in Beijing the company demonstrated 49 new products for the banking, education and management markets, many of which operate in Chinese. The company currently employs about 800 people in China and is involved in five joint ventures.

Such joint ventures have been characteristic of large IT forays into both China and India, as both countries fight to benefit economically and not just technologically from the incursion of bits and bytes. In China, the involvement of local IT partnerships is

mandatory, but in technology adoption remains characterised by incompatible equipment and unwarranted secrecy. A report in UPI suggests that 90% of the electronic mail boxes brought from the US in 1992 remain idle, while the National Library's \$US8 million investment in NEC computers in 1988 did not take into consideration the fact that they would not work with the library's existing IBM machines. Inefficiency, rather than lack of funding, is blamed.

In India, the rules on local involvement in technology ventures have seen a recent relaxation, causing companies such as Unisys to consider the viability of going it alone. The value of promoting the market, which currently sits at 150,000 to 200,000 computers per year, is held to be greater than that of trying to protect a weak or non-existent local product. Growth prospects are very good, with the networking market sustaining 200% growth in the past year and expecting a repeat performance in the current year. Reuters reports a recent speech by Intel Asia Electronics Inc's

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Ram Ramaswamy calling for duties on computers and computer systems to be cut to increase the potential for sales. "There is no industry locally for the government to protect nor is it getting any revenue," he said. He called for the duties of 68% and 90% respectively to be cut to 25%, saying that the move would enable manufacturers to cut prices and reduce the incidence of smuggling. Illegal entry of PCs and the widespread incidence of piracy remain a significant threat to India's ability to grow its IT industry, particularly in software, which, unlike hardware, represents one of the fastest growing industry segments. A recent announcement of a \$US1 million campaign by the BSA and the Delhi-based National Association of Software and Service Companies to begin anti-piracy raids is seen as a positive move. The industry is young, says the association's Dewang Metha, and thus the prospects for overcoming the problem are good. "This isn't only to help the big American software companies. This will help Indian companies," he said.

The rationale for encouraging growth in IT is not just for technology's sake, but as a growth mechanism for other human services and export opportunities. A speech by Pakistani Prime Minister Benazir Bhutto to the Commission on Science and Technology for Sustainable Development in September embodied the belief that excellence in research, especially in emerging fields such as laser, fibre optic, computers and communications pointed the way forward for third world countries. "If the vast areas of the Third World, where the bulk of the human race lives, continue to trail behind the technologically advanced nations, the world as a whole will be confronted with destabilising impulses," she said. She also argued that such needs for food, clothing, shelter and improved health facilities could be met only through achievements in science and technology.

Hen Dancer

COMDEX highlights from page 9

"Marvel" on Monday, subsequent to his keynote address. He further explained how the multimedia online service fits into Microsoft's grand vision for the future of computing; a vision Microsoft calls "Information at your fingertips".

A unique, and also controversial feature of the service is its availability — The Microsoft Network will come as an element of the Windows 95 operating system which is due for release in mid-1995. Intended as a market strategy as well as providing users with an easy to use system, The Microsoft Network is expected to attract at least 3 million users within a year of its debut, and it will eventually be available in 35 countries. However, president of America Online Steve Case has stated that by offering the service with Windows 95, the company may have an unfair advantage.

Gates insists that there are multiple options for users who are interested in going online, and that some users will choose The Microsoft Network, some will choose another service or even a combination of the two. The company is simply providing an easier way for people to get online.

Despite the focus on IBM and Microsoft, the other major players in the computing arena — such as Motorola and Apple — were more than well received.

Motorola Computer Group announced an OEM agreement with Microsoft Corporation to license and resell PowerPC versions of Microsoft Windows NT Workstation Version 3.5 and Microsoft Windows NT Server Version 3.5 operating system.

Beta software versions of Windows NT Workstation Version 3.5 and Windows NT Server version 3.5 with PowerStack systems will be offered by Motorola this year, and production availability is scheduled for the first quarter of 1995.

Apple announced the Power Macintosh 6100 DOS Compatible system and DOS Compatibility Card for the Power Macintosh 6100 and Macintosh Performa 6100 Series. The products are intended to provide more cross-platform compatibility between the Macintosh and Windows/x86 platform. Dual processors are featured in the Power Macintosh 6100 DOS Compatible which allows users to work in DOS and Macintosh environments at the same time.

And finally, Novell presented and CEO Robert Frankenberg discussed in his keynote the advantages of the yet-

to-be-released NetWare 4.1 as well as stressing the importance of Novell's CORSAIR advanced client. The latest version of NetWare, when released, will also offer multiple user benefits such as the integration of telephone, e-mail, voice mail and network user directories into one through NetWare Directory Services.

Among the other product highlights at COMDEX were storage products from companies such as TDK, Conner Peripherals and SunDisk.

TDK Electronics announced its first ever line of QIC tape cartridges. The 11 cartridge line is available in both 3.5in and 5.25in form factors and feature a permanently mounted mirror on the metal base plate to detect the beginning or end of a tape to reduce the risk of it running off the hub.

Kingston Technology introduced a removable hard disk subsystem that supports up to three one-inch high form factor SACS devices simultaneously. The Data Express DE300 is composed of three device carriers mounted in a single receiving frame and is available in both an internal and external version. Prices for the DE300 begin at SUS395.

Conner Peripherals' Tape Products Group announced the first ATA Packet Interface (ATAPI) IDE minicardridge tape drive. The CIM4000I-A tape drive supplies 2G native format, and 4G using software compression. Its data rates reach up to 54M per minute.

The CIM4000I-A will be available in sample quantities to OEMs this month for SUS385, and volume production will start next year.

SunDisk Corporation demonstrated three of its new flash storage products: The CompactFlash, touted as the world's smallest removable storage system; the Hummingbird, a 1.3in form factor flash storage product, and its new 80M 1.8in flash storage device.

The new 80M 1.8 IDE FlashDrive is an embedded storage product. The storage capacity can be doubled to 160M with a pre-loaded Stacker compression technology option.

Toshiba displayed its new MK-1924 Series drives. The drives offer a 540M capacity and a 13ms average seek time in 0.5in high, 2.5in form factor. The MK-1924 Series drives have Fast ATA and SCSI-2 interface support and feature a 128K cache memory, including write-cache. The two platter design of the drives offer a rapid spin rate of 4200rpm.

The MK-1924 Series drives will be available next year for about SUS435.

Among the more exciting mobile products introduced at the show, a multimedia notebook computer with an internal, full-size CD-ROM and 16-bit stereo sound was introduced by Panasonic Personal Computer. The V41 provides full multimedia capabilities without requiring a docking station or AC power.

Hewlett-Packard offers mobile computer users a new version of the OmniBook subnotebook as well as several new colour inkjet computers to be used by portable users. Backlight difficulties have been corrected in the OmniBook 600, with the use of a dual-scan passive-matrix colour screen. The notebook, with a price tag of SUS2,599, utilises a 25/75MHz DX4 chip from Intel.

Samsung Semiconductor presented a family of flat panel displays based on the patented Thin Film Transistor (TFT) design — it reportedly delivers the highest quality image on the market. The displays produce at least 20% more light than competitors' products, according to Samsung.

The first communications device that offers a 14,400bps cellular data/fax/voice modem and an alphanumeric pager on a PCMCIA Type II card has been introduced by Fremont, US-based NovaLink Technologies. With a suggested list price of SUS449, the NovaPack unit has cellular and standard phone line connections to provide high-speed wired or wireless communications from any location on the globe.

With users wanting more portability, multi-functional PCMCIA cards, ranging from security tokens to multimedia sound cards, abounded at COMDEX.

Smart Modular Technologies announced a combination fax/modem/memory PCMCIA card for Hewlett-Packard's palmtop computers. The card can be plugged into either the Type II or III slot and allows users to send, receive, store and print faxes and large data files. The Flash memory options are 2M, 4M, or 6M.

Toshiba unveiled plug and play PCMCIA mass storage cards at the show. Available in both Type I or II, the PCMCIA/ATA cards support all Type II compliant notebooks, as well as operating in both DOS and Windows.

TDK systems announced a V.34 PCMCIA modem card which is based on the new International Telecommunications Union V.34 standard. The DF2814 card supports 28.8 Kbit/sec data, 14.4Kbit/sec send and receive fax, V.42bis/MNP 5 data compression, and V.42/MNP 2-4 error correction.

**Erin English
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(* Notebook's colour screens are the only exception - a one year warranty applies.)

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INDUSTRY

ABS reports on PC status in Australia

The Australian Bureau of Statistics has announced that it is working on three reports investigating critical aspects of IT in Australia — providers of IT, corporate users, and the ever expanding SOHO market. The first of the reports, which the bureau expects to be ready by Christmas, will centre around producers of IT. A more adventurous undertaking, planned for next year, will definitively detail how many Australian households have a PC, a fax machine, a printer, CD-ROM drive and/or a modem.

It is an idea which has been on the drawing board for a number of years, according to the ABS' assistant director of technology statistics, David McGeachie, with much lobbying from the industry itself to make the information available, but the bureau was hamstrung by the lack of a workable framework. "As you will appreciate, the informa-

The bureau has the advantage over its commercial partners, in that its respondents are compelled to provide information

tion technology industry is so diverse, and constantly evolving, the methodology had to be wide enough to encompass variations but tight enough to produce meaningful results." Additionally, the Standard Industry classification, on which much of the bureau's research model is based, does not encompass IT as a separate entity. Consultation with industry research companies, such as IDC Research, has evolved a workable framework, which Mr McGeachie is confident will

return a benefit to both providers and customers. He concedes that the bureau has the advantage over its commercial partners, in that its respondents are compelled to provide information, and be accurate. "Under the Census and Statistics Act people are required to answer our questionnaires;

additionally, providing information which is either deliberately wrong or can be construed to be misleading is a prosecutable offence," he said.

His department's reports will add weight to, rather than replace more traditional IT statistics sources, he believes. The dual advantage of compulsion on the part of respon-

dents, and the organisation's name lending an official quality to the information, will serve the industry, rather than just the bureau's reputation.

The business report is based on a survey of more than 8,500 companies and the SOHO report is based on the more than 5.5 million households around the country.

Each of these reports, as they become available, can be obtained from the Bureau of Statistics in Canberra, by phoning

The ABS reports will add weight to, rather than replace, more traditional IT statistics sources

(06) 252 5614. The bureau has yet to determine the cost to customers.

Helen Dancer

ACS to link membership

Full Internet access is now available to Australian Computer Society members anywhere in the country, for the cost of a local call. A once-only connection fee of \$50 allows ACS members up to 10 hours of access per month to ACS-link, a new national network designed to bring the local information technology community closer together.

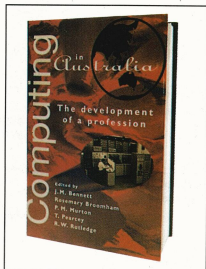
Meanwhile, the society has launched a history of the industry entitled *Computing In Australia - The development of a profession*, and announced plans for a national congress in September, ITWorld '95.

Users of ACS-link will be given an e-mail address in the form user@acs.org.au and will have access to libraries of industry-related information,

discussion conferences, fax/telex services and Internet resources as a whole. Access is via terminal emulation or SLIP/PPP connection (where the user's computer is a full Internet participant in itself).

ACS-link allows members 10 hours of off-peak usage or five hours at peak times. Extra time online is charged at an hourly rate, but there is no limit on the volume of data transferred. The network has been created in conjunction with Queensland-based Internet provider Pegasus Network Communications.

Computing In Australia is a



comprehensive history of information technology in this country and comprises over 300 pages of "first-hand ac-

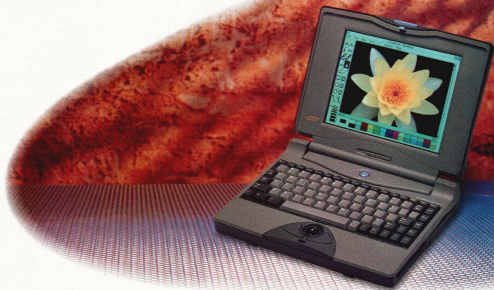
counts from the pioneers of the profession".

The ITWorld '95 conference, to be held in Brisbane, is aimed at enabling all the industry and professional groups in Australia to exchange ideas, and will consist of a mixture of keynote speakers and workshop-style forums. The congress is being planned with the Australian Information Industry Association (AIIA) and the two organisations anticipate an event unprecedented in Australia, with speakers to whom most of the population would not usually have access.

If you're looking for more information on any of the Society's activities, you can e-mail info@acs.org.au or phone the Australian Computer Society on (02) 211 5855.

Simon Vandore

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SAMSUNG
ELECTRONICS

Ziff-Davis wooed and won by investor

Ziff-Davis, publisher of *PC Magazine* and *PC Week* in the US has been partially carved up, with its online, database and conference businesses sold separately to the magazines.

The company represented a true convergence of the media types and interests that the computer industry itself has been preaching for over 12 months. APC takes its benchmarking methodology and licenses some material from Ziff's *PC Magazine*. One of Ziff's most significant steps along the path to a publishing superhighway was the establishment of the Interchange Online Network service which represents a delivery mechanism for its own content, and an avenue for revenue as the provider of other companies' content, its most recent agreement being signed with Cowles Business Media.

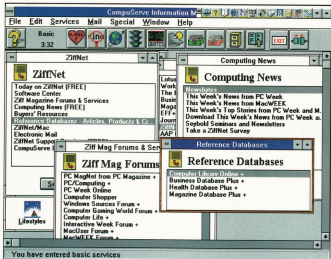
Industry analysts were all predicting that the sale would inevitably go to a competing publishing house which would absorb the Ziff culture into its own organisation, but in the end the company was sold in parts rather than in its converged entity. And with suitors such as H&R Block, owners of CompuServe Inc, Knight Ridder, Reed Elsevier,

Japanese software distributor Softbank Corp and German media group Bertelsmann AG, it was something of a surprise that the giant publishing house has been largely acquired by investor Forstmann Little & Co, for a cool \$US1.4 billion in cash.

The company has by no means sat cooling its heels waiting for a purchaser, announcing the launch in August of a German pilot magazine called *Familie & Computer* to meet demand from the burgeoning home computer marketplace. At the same time, the company announced a joint venture with Spanish language publisher Editorial Televisa to launch *PC/Computing* in Spain in Mexico.

The acquisition includes Ziff-Davis' business magazines group, the international media group, market research group and Ziff-Davis Interactive. It does not however include the trade show business, nor Interchange Online Network and Information Access Co.

Forstmann's ownership of the San Diego based General Instruments, one of the leading suppliers of cable TV set top boxes and satellite encryption may yet prove to be more than a coincidence. The company



ZiffNet stays with the magazines, Interchange and Computer Library have been split

also has interests in both digital video design and broadband networks on cable and satellite. The purchase of the info-savvy publishing house fits well with the paradigm of content and delivery mechanism, especially considering the company's earlier dalliances with high tech companies such as Cable Labs, TCI and AT&T.

According to Dow Jones & Co, Forstmann Little senior partner Theodore Forstmann told a press conference after the acquisition that the company had no plans to sell off parts of

the company, nor could it confirm that while this was its first media company acquisition, it would be the last. "Almost everything we do is for the first time... We try to find businesses that are dominant in what they do, display significant growth potential and have an excellent management in place," he said.

No plans are in place to retrain staff or to radically alter the publishing processes. The Ziff family will retain a small equity interest in the company.

Helen Dancer

High tech deregulation in Congress

A shift in the balance of power in the US Congress promises to greatly contribute to the establishment of the national information infrastructure.

With all ballots cast in the 1994 elections, the Republican presence in Congress swelled overnight from a 41% minority to a 53% majority.

"We are looking forward to working with this Congress to work toward an open and competitive marketplace," said a spokesperson at the National Telecommunications and Information Administration, an advisory committee that works with the White House on telecom issues. "We anticipate that new legislation will be quickly introduced."

But industry experts have mixed feelings on the effectiveness of the Congress' new Republican majority.

"This is a very exciting moment in the information superhighway debate," said Troy Eid, executive director of the Institute for Information Law and Policy, part of the Colorado-based think tank centre for the New West.

"The Clinton Administration and the Democrats (in Congress) focussed on creating programs that would give subsidies to promising new technologies such as telemedicine. But the Republicans won't be the ones to pick and choose which programs will have their hands on the purse strings. Instead they will call for

overall deregulation."

Vice president Al Gore has been very vocal of his vision of a national information infrastructure. But industry sources are critical of the Clinton Administration's inability to present Congress with a package that will make Gore's dream a reality.

A year-long effort intended to allow local, long-distance, and cable television companies to compete with one another was quashed in September by service provider squabbling and a divided Congress.

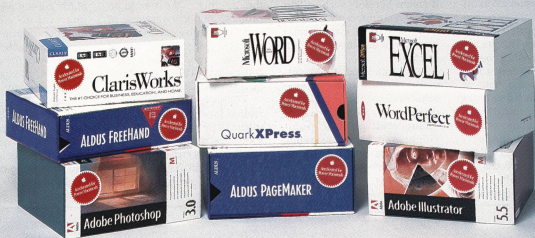
While Eid is optimistic that the new Congress will pass the act and otherwise pave the road for the establishment of the info superhighway, others fear that themes like universal service and Internet

access for everyone will be overlooked by the new Congress. "It is not clear to me that these are things that the Republican party will stand behind," said Leonard Kleinrock, Chief Operating Officer and chairman of US-based Technology Transfer Institute and chairman of University of California, Los Angeles' Computer Science Department.

"It is the research, education, library, and health communities that need governmental support when it comes to getting online," he continued. "The Republicans may not make the funding of these groups a priority."

**Brian Riggs
Editech**

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NETWORKING

What's new on the Net

The Internet is always good for a plethora of new offerings in super-communication. Here are some of the latest to grace its bitstreams.

Latest election results

During the November 8 US elections, Californians were liberated from awaiting traditional sources of election night news. Instead, they could tune into the California Election/Internet project and get continuous live coverage.

Jointly administered by Digital Equipment Corp (DEC) and the State of California, the Internet/California State Election site is the largest Internet project to date. At last count, it had been accessed by over one million Internauts, including TV news crews relying on their Internet feeds for the latest election updates. Internet/California continues to be located on the World Wide Web. The site features an interactive map outlining votes by county district, final election results and data on state-wide candidates, ballot propositions, political party goals and electoral procedures.

Because of the project's success, California plans similar future endeavours, according to California Acting Secretary of State Tony Miller.

Business on the Net

When asked what they would most like to use the Internet for, information system executives voted for videoconferencing, says a new US survey. Thanks to Mbone, the Internet's video-ready section, this may soon be a popular Net application.

Mbone is a network overlay that acts as a video service. Using a multi-cast messaging broadcast, it deploys a copy of the video data packet which is then replicated only at its final designation. Traditional network broadcasting calls for every message packet to be duplicated at every destination point, often resulting in delays.

Mbone applications are enabled by Distant Vector Multicast Routing Protocol (DVMP), part of the public domain. Vendors such as Sun Microsystems and Silicon Graphics have commercial versions of enhanced DVMP available.

The estimated 1,400 networks already using Mbone acknowledge that its picture quality lags behind that of commercial point-to-point videoconferencing systems. But vendors are working on tools for improvement.

Last year, Mbone enabled the worldwide Internet broad-

cast of the science fiction cult film *Wax: Or the discovery of television among the bees*.

Internet Business Association

Now there is an information forum on the global information source. The Internet Business Association (IBA), based in Washington, DC, has declared its mission of becoming the source of Net propaganda.

Founded by seven leading Internet access and software providers whose members include InterCon Systems Corp, Performance Systems International and Frontier Technologies Corp, the IBA announced itself in June at the US Internet World conference.

"It is our goal to help the general public fully understand and enjoy the power of the Internet. We intend to promote public awareness of the technology while encouraging responsible use of its resources," said Kurt Baumann, IBA Founding Member and CEO of InterCon.

To this end, IBA is disseminating brochures and online information and organising speeches by key IBA officials. A full-time lobbyist is planned for Capitol Hill to influence US government control of the Internet future.

Directory news

To the delight of users, the first online Internet white pages, released last October, comes equipped with Pretty Good Privacy (PGP) for encryption certification and storage services. US-based SLED Corp's Four11 software consists of 500,000 initial listings obtained from Usenet listings. Access to these listings with PGP encryption is provided as a free service. Additional services, including an expanded directory, Search Agents and a personalised display message cost \$US20.

The two services will make it easy for users to find someone, obtain their key and send them a private message, SLED claims. And consumers can feel safe conducting online credit card transactions with SLED Silver Signature. The encryption certification method requires that a personal check which has cleared, or a copy of the user's driver's licence or passport be sent to the company. Once the encryption keys are certified, they are signed and added to the key owner's directory listing where they may be accessed by other Internet users.

Lisa Armstrong and Erin English
Editech



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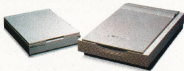
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Spank that plank — rock gets online and interactive

The Rolling Stones rolled onto the Net on November 18 when a section of their Voodoo Lounge tour was cybercast over the Internet. New York multimedia company Thinking Pictures was given the go ahead by the "Strolling Bones" to broadcast over the Internet the first five songs from their Friday night show at Dallas' Cotton Bowl stadium. "It's rock 'n' roll's footprint on the internet," Thinking Pictures' partner Stephan Fitch enthused.

Toeprint may be a more accurate term than footprint, however, since the heavy hardware required to view the broadcast restricted its audience considerably. To be part of the party, netheads needed to have access to a Sun SPARCstation (or equivalent) and the Multicast Backbone (Mbone), a collection of Internet sites with powerful workstations which make use of particular protocol and routing systems and provide a co-operative virtual network for live video and audio signals. If they are able to match these demanding pre-requisites, Stones fans received 320 by 240 resolution eight-bit video at approximately eight frames per second of Mick and the boys. Accordingly, the dubious pleasure of the show was

restricted to members of universities and larger corporations able to meet the requirements and establish a connection.

Mr Fitch was a little more on the ball when he indicated that the broadcast gives an indication of the limitations of the Internet. Like the space shuttle broadcast that preceded it, the Stones show proved that live video footage over the Internet is still at best a slow and ponderous business, but it is another example of how the forces of entertainment are gradually colonising the IT world. More than 200 publications are now online, including titles as diverse as *Time* magazine and *Wired*. *Playboy* is now working with Creative Artists Agency on plans to jump onto the Net next year, claiming the most commonly used word on the Internet is "sex" and the sixth is "Playboy". They currently offer a WWW "home" page for subscriptions and ordering products.

It's in the music industry, however, that many of the most exciting developments are occurring. Far from being behind in this competitive arena, Australia is leading the world in interactive music CD-ROM technology, as evidenced by the recent release of an interactive CD by local dance act GF4.

Chris Gilby, A&R Manager from GF4's record company BMG, enthused about the "reverse compatibility" technology of the disc, which allows it to play on both a CD-player and CD-ROM drive without having to resort to multi-session, but also pointed out some limitations he has noticed in the attitude to technology within the industry in this country. "The Australian music industry in general is an extraordinarily low-tech industry, run by executives who have no idea of what a computer is," Mr Gilby said. However, he was keen for every record BMG produced to carry the "reverse compatibility" technology.

Mike Franzcek is creative director of Pacific Advanced Multimedia Studios (PAMS), the company responsible for the interactive part of the disc. "All up you've got around 100 video clips over about half an hour," he said, summing up the disc's contents. He emphasised that part of the company's aim was to make the process affordable to the average recording band.

"If you were doing a Peter Gabriel-type Xplora project you'd need 18 months and a million pounds. We produced GF4 in about six weeks, and we tried to fit into a budget of \$20,000 to \$50,000," Mr Fran-

zcek stated. "We're trying to set up a working model that will allow most recording bands to get into interactive multimedia. When you buy Explora for \$120 you can only play it on a CD-ROM. With our GF4, you pay \$8 for something that can be played on Mac or Windows or a CD player."

The "reverse compatibility" technology that allows this multiplicity of use is called Interactive Audio, and represents a story in itself. "GF4 is unique in that it's the first IA CD in the world to effectively hide the computer data," Mr Franzcek claimed. "The technology we've developed forces the CD-player to ignore the computer data and move some 40 minutes into the CD and play just the music automatically. We've patented the technology and have been receiving calls from people in the States."

Interestingly, industry behemoths Sony and Philips have only just announced that they are working on CD Plus, a "new" type of compact disc that will "work on both a CD player and a PC's CD-ROM player."

Nathaniel Tunbridge and Simon Vandore

SOFTWARE

Software piracy on the open IRCs

Software pirates, who have developed their own Internet subculture, are now playing with Microsoft Windows 95 beta versions and IBM's OS/2 Warp.

Stored in secret directories on FTP servers, the new operating systems and other commercial software are often traded via pirate-run channels on Internet Relay Chat (IRC). Individuals swap knowledge of what is available and how to get it, or ask who is "offering" — providing such knowledge without demanding anything in return.

In a recent incident, hackers posted Windows 95, Warp and several other programs on a Florida State University server by breaking into the system, creating a secret directory and uploading the files.



DOOM is a popular target for software pirates.

After the location was advertised on IRC, Florida State's systems administrator Ray Curci was alerted by a massive surge in user numbers and watched hundreds of people from all over the world download the files (which he had already deliberately corrupted). Expressing extreme concern and anger, Microsoft and DeScribe offered a total of \$US30,000 in rewards for the

arrest and conviction of these hackers.

The more hard-core pirates are able to hack false user IDs to disguise their identities when chatting on IRC. According to such individuals to whom APC spoke, secret FTP directories are usually created with control characters in their names, requiring specific knowledge for access. A login script must therefore be used,

preventing the control character from acting as a system command, such as with Control-C on a DOS system.

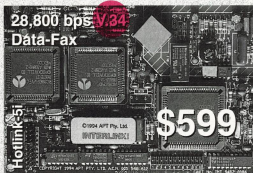
The culture of information exchange perpetuates itself — offering software that is in demand will be rewarded with tip-offs about other sites. In other words, providing access to something like Windows 95 would probably have been very profitable for the individuals responsible.

On an IRC channel visited by APC for 30 minutes, products mentioned, offered and requested were Windows 95, OS/2 Warp, DeScribe, Xsoftware/32, Chameleon, Internet In A Box, and the games Rise of the Robots and Project X. There was even a specific request for "disk 2&3 of Win95m7."

Simon Vandore

MODEMS

by INTERLINK

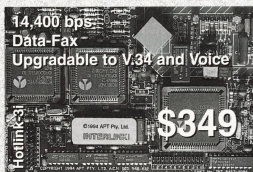
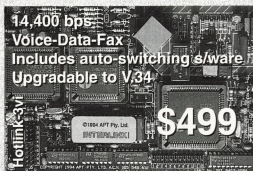


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Digital visionaries

Do you enjoy using your PC? If the answer is no, you're not alone. Clifford Nass, an associate professor in communications at Stanford University in California, is one of a handful of researchers who study how people interact with computers. With his Stanford colleague Byron Reeves, they are conducting behavioural studies of human interaction with computers. Partly funded by Apple, IBM, and Microsoft, the research has subtly transformed products made by these companies.

What's wrong with interfaces today?

CN: Almost everything. Interfaces sacrifice cooperative interaction for precision. Small, incremental changes to Windows aren't going to be enough. The user interface needs a whole rethinking, starting from a very different premise. The radical shift will be that new interfaces will focus more on a user's perceptions of the experience rather than on the actual experience. Speed and functionality are going to become less important, while perceived functionality and user enjoyment will become more important.

What have you discovered about human/computer interaction?

CN: We've been exploring the theory that individual interactions with computers are fundamentally social. For a long time, human/computer interaction was an engineering problem. Where do we

put the key to maximise speed? You're not going to understand how people feel from that. Rather than using focus groups, which are very crude methods of measurement, you can use methods ranging from questionnaires to EEG and EKG results to study physiological responses. We've done research on teamwork, and all you have to do is label a computer a teammate and people like it much better. By simply changing interface wording, we gave computers either dominant (where the computer prompts you) or submissive (where the computer responds to your input) personalities. Confident people preferred the confident dominant computer, while under-confident people preferred the submissive computer. And that's exactly what happens with people — people like people like themselves.

What's driving the next-generation computer interface?

CN: Interactive television, agents, and artificial intelligence systems are driving the next-generation interface. But more than technology, the need to grow a consumer market is going to drive the evolution of the interface. Until now, interfaces have not been designed to respond to what people want or to feelings. They were designed around efficiency. It's a case of understanding human social reactions.

Melissa Perenson

Monday night by satellite

Anyone who's seen any one of the various Star Trek series will be familiar with the Replicator, a machine able to produce any number of foodstuffs and beverages at a moment's notice, given the right instructions. The great thing about the Replicator was that it didn't require any clumsy, space-occupying ingredients in order to produce the desired item. Just ask and ye shall receive, Jim.

Needless to say, I've wanted a Replicator for a long time. A new alliance by IBM and Hughes Network Systems may be a step in the right direction.

Hughes is reportedly the largest seller of corporate satellite equipment in the world, most recently in this country working with Optus. Two months ago, in the US, it began selling DirecTV, a SUST700, 18in satellite receiver dish that can pick up 150 TV channels. Boosted by the promising initial demand for DirecTV, Hughes has now announced DirecPC, a similar receiver that will work with a PC to pick up signals from a dedicated satellite. The DirecPC package will include the 24in receiving dish, a PC component board, software and wiring for SUST495. Hughes added that there would be an additional charge of SUST5.95 a month for the satellite data service. Not only does the satellite promise lightning fast data transfer across the planet, but it could revolutionise the way in which software is delivered.

IBM's interest in the satellite system relates partly to the possibilities it holds in providing software updates for corporate customers. The same theory can be applied to the retail sector. Using the system to download new software to retail outlets would eliminate the huge amount of time and expense involved in shipping a product on floppy disk. IBM has said it will provide a touch-screen kiosk for use in shops to allow customers to browse through the software currently available. When they find what they like, the program will be downloaded from an electronic library (what amounts to an in-store server) to diskettes. When it's time for an upgrade or new software, the data is downloaded into the library over satellite.

Interestingly, it's the same process that black-market software retailers in Hong Kong have been using for several years, although without the dual benefits of satellite communications and legality.

Satellite suggests itself as an obvious way to speed up those infamous heifers of the Internet — sound and video. Downloading into-heavy items from the Internet, even using a 14,400 modem, is an exercise in angelic patience. Home users can look forward to using Hughes' T1 line, a 1.5 million bits per second clear channel, to access the Internet. Company officials claimed a 40M piece of software could be downloaded using the system in under four minutes.

Nat Tunbridge

SYSTEMS

IBM at home, Novell hits the street

Two companies known more in the corporate marketplace than home and hearth have made their bid for the home market just in time for Christmas.

IBM has released six models in its Aptiva range, of three basic configurations, with an optional multimedia version for each model. The range comprises one SX and two DX models. The 486SX2/50 has 4M RAM and 270M HDD as standard. RAM in these machines is expandable



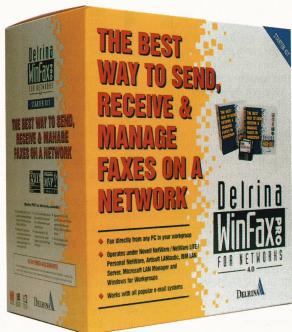
There are six models in IBM's new Aptiva range.

to 64M, and hard drive to 1G. Further up the scale there are a 486DX2/50 and a DX2/66, both offering 4M RAM expandable to 128M, and 363M hard drives expandable to 1G.

All machines in the range feature energy management capabilities, including a suspend/resume feature, and a power off feature which will, after 15 minutes of inactivity, close all folders so work is protected and switch the power off.

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each include a double spin CD-ROM drive, 16-bit sound card, stereo speakers and a range of multimedia software including presentation tools, entertainment packages from Future Vision and a CD of 80 games. Optionally, customers can also choose a unit with a modem, from Australian developer Banksia. The 486SX model has a starting retail price of \$2,499 for the standard model and \$2,999 for the multimedia version, while the DX2/50 is priced at \$2,899 for the standard and \$3,399 for the multimedia version, and the top of the range DX2/66 carries a price tag of \$3,299 and \$3,799 for standard and multimedia models respectively.

On the software front WordPerfect, the Novell Applications Group, has released 12 new titles in its MainStreet range, designed for education, entertainment and personal productivity in the home context. Priced from \$59 for the home entertainment packages, to \$99 for CD-based entertainment tools, and up to \$199 for the new version InfoCentral (1.1), the theme of the

new release is pervasive computing. Novell has a vision, says managing director Graeme Inchley, of reaching a billion users by the end of the decade, thus the MainStreet range reflects the need to provide software tools for all ages and all purposes.

The Adventures of Wallobee Jack, in two different incarnations, the Lost Lionard and the Secret of the Sphinx is an animated fun package, while Memphis Math: Treasure of the Tombs has the much more serious objective of teaching fractions, from early learning to advanced stages.

The MainStreet series is based on co-operative research with the Waterford Institute, a non-profit organisation which researches the effective use of technology in teaching reading and maths.

For more information about the Aptiva range, contact IBM on 008 815 154, and for the MainStreet range contact Novell on (02) 925 3822 from Sydney or 008 244 364 elsewhere in Australia.

Helen Dancer

Roll up your screen!

Plastic transistors may change the shape of portable computing. Imagine the possibilities if you could roll up your notebook screen as you would a sheet of paper. Thanks to recent work by Francis Garnier and his colleagues at the French National Centre for Scientific Research (CNRS), we soon may see semiconductor products that are more flexible than the traditional designs based on silicon and may drive a new era of portable computing.

The flexibility comes from the use of organic plastics, so no metal is required. Special conductive polymer inks are placed on plastic films using traditional printing processes. So rather than being etched on tiny transistors and connection wires, the active elements of a circuit board or liquid crystal

display screen are printed on a sheet of plastic. According to Garnier, polymer-based transistors are not new, but their efficiency has been only about 1/1,000 as efficient as silicon designs. But in 1990, Garnier's group found a way to use special chemicals called conjugated oligomers to make plastic semiconductors that were about 1/100 as efficient as silicon. Around the same time, a group in Cambridge, England, developed ways to create LEDs (light-emitting diodes) using organic semiconductors. The combination of these technologies was enough to spur a new way of looking at electronic designs.

Until now, however, these designs have relied on metal conductors. Using chemical engineering to create molecules that are "self-constructing" so they align themselves correctly as they are deposited on a surface, Garnier's group has been able to improve efficiencies and eliminate metal electrodes. The result is a transistor that's about one-tenth to one-fifth as efficient as a silicon design and also so flexible that the sheet can be rolled and twisted without damaging connections.

IBM and BASF have already published research findings that demonstrate that polymer electrodes can be created at the micron level.

Garnier is confident that his group can solve some of the remaining problems of device efficiency and size. He also is working on a transparent plastic transistor using the same techniques. This would make it possible to create clear displays for cars and aircraft, which could be attached to the curved surfaces of windshields. "Plastic semiconductors won't replace amorphous silicon," Garnier points out. "We need to think in terms of new applications."

Alfred Poor

World Wide Notes?

Lotus is pitching the public access future of Notes on the Internet, with the release of tools designed to allow Notes to be used as a complete solution for Web server deployment. It will also improve a two way flow of information between Notes users and the Internet, initially via newsgroup browsing technology, but eventually with the possibility of Web access from within Notes.

The new product family, called InterNotes, has been under development for the last six months under the care of John Landry. It will allow Notes sites to output their Notes databases to a Web server, either in batches or interactively, running either on a separate server under Windows NT, or on the same box as their Notes server.

According to Alison Parker, InterNotes product manager, the Internet is a global, public access oriented system with a unique culture. Notes on the other hand is a private solution for enterprise WANs. The Web is document centric, uses rich media forms, hyper-

links and fielded forms in a client server environment, making it in some ways similar to Notes, but Notes offers security, local storage and replication technology, search engines, desktop application integration and a professional authoring and development environment.

"We did not want to create another standard," says Parker, "but work with current standards."

InterNotes allows corporations to take information, or subsets of information they already have in Notes databases, and using the InterNotes Web Server, publish that information with Notes forms and views represented as HTML documents publicly over the net. At the same time, the integrity and security of their original Notes systems remains intact, because the Notes server itself is not accessed. The InterNotes Web Server acts in effect as a firewall.

Parker says that Notes already has reasonable Internet connectivity, with SMTP mail transfer, TCP/IP access for

both client to server and server to server replication over the Internet, as well as third party newsgroup solutions such as JSoft, CIS and WorldCom.

InterNotes is designed to complement Lotus AT&T Network Notes strategy, which has been touted as a "business Internet", but provides a guaranteed commercially strict environment for Notes replication and information access. "When we started the project we thought the AT&T people would hate us," says Parker.

"We're cognisant of the free development and cultural issues that need to be grappled with on the Internet. We are in the business of making packaged software with warranties and guarantees. We're looking for ways to make sure we do this right."

To try and "lurk" better, Lotus has a Web site at <http://www.lotus.com/>, and beta copies of its InterNotes News Gateway will be available from <http://www.notes.net/>.

Jeremy White

TRUE MULTI-MEDIA NOTEBOOK

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- Built-in Sound Card
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- IMB VLB Video Card
- SCSI CD-ROM Adapter (opt)

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There are ports for external monitor and speakers for maximum theatre impact.

The Microscience Multi-Media WinBook system will just blow you away, yet is just 44mm high and weighs just 2.7kg.

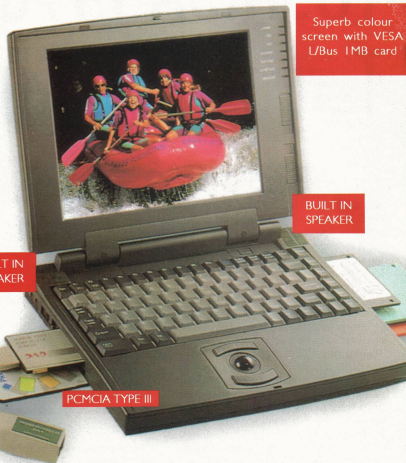
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TOSHIBA T4900CT

The question arising in this humble brain on being presented with a machine of such capability yet compactness is — Who on earth would need to carry around that much power?

The answer, before too long, will be you, me and everybody.

Toshiba has again set the precedent in a new genre. APC approached other vendors to attempt a comparison review, but was told in each case that comparable configurations, while announced, weren't available yet.

The review machine was a pre-release version, and as such suffered minor idiosyncrasies. Even with these it made for an impressive unit, however. It is a slick little representation of the new high end in portable computing.

Any potential heat problem has been circumvented with the use of proprietary Toshiba heat-sink technology, a combination of the company's tab bonding manufacturing process and Intel's integrated tape carrier packaging (TCP). TCP is Intel's process for reducing the volume of processor packaging. Tab bonding it to the motherboard allows heat to be quickly dissipated.

The notebook is also based on power-saving 3.3volt technology. Intel's SL technology allows power saving to be initiated at both system level and microprocessor level, which means that power saving can be achieved during non-processor intensive tasks, such as word processing, as well as putting the machine into "sleep" mode during periods without a mouse move or keystroke.

The T4900CT comes with a staggering 810M hard drive, and can accommodate up to 40M memory (8M is standard). Toshiba claims a battery life of up to 3.5 hours, while APC's battery rundown result was slightly lower, at 2 hours, 51 minutes. With power management enabled, users can expect even greater time periods.

The notebook has an unusually large active-matrix TFT display — 10.4 inches — but boasting up to 65,000 colours. The result of the increased size is that the notebook is remarkably easy to use for extended periods, without the eye-hunched syndrome that protracted notebook use engenders. It is a comfortable



While not benchmarking as well as expected, the T4900CT still sets a new technology highpoint.

machine to use, except for the belly button mouse, which is incredibly sensitive in comparison to those in the ThinkPad and NEC notebooks, and too difficult to train for my liking. Also the mouse buttons are located on the front of the machine rather than the top, which requires continual repositioning of the hands. This feature would probably only prove annoying if the task involved a lot of typing (most of mine do!).

Although this was a pre-release model,

we did run our PCbench, Winbench and Winstone tests on the machine. While most results were fair, and the disk scores excellent — the final figures did not offer the leap in performance expected from the machine's nearest rivals, the 486DX4s. The eventual processor result of 30.72 was 15 points below the top scoring Texas Instruments 486DX/75 notebook in APC's September DX4/75 comparison. The unit is designed around extended data-out (EDO) memory that holds data in the system memory available to the processor.

The Disk Winmark of 1010 shows the combination of the 810M drive and disk controller are ideal, but no better than disk results from Toshiba's T4800CT, a 486DX4/75 unit. The Graphic WinMark of 4.1 and Video Harmonic of 2334.24 were far from spectacular.

Helen Dancer and Ben Gerholt

*Toshiba T4900CT
Distributor: Toshiba
Phone: (02) 887 3322
Price: \$13,776*

In short: APC will certainly be waiting for the production version before passing final judgement.

Benchmarks results: Toshiba T4900CT

Winstone:	24.9
Disk Winmark:	1010
Graphics Winmark:	4.1
DOSMark:	482.68
Processor:	30.72
Video:	2334.24
Disk:	918.00
Battery rundown:	2:51

The Best Monitor

MONITORS: OVERALL RELIABILITY

Brand	Reliability Score
Apple	7.2
HP	6.9
SAMSUNG	6.8
BenQ	6.7
Commodore	6.7
Compaq	6.7
Corbis	6.7
Acir	6.7
Gamma	6.7
Quart	6.7
Viewsonic	6.7
Westcott	6.7
Combination	6.7
Amity	6.7
Test	6.7
Average	6.7
IBM	6.6
Mag	6.6
PCV	6.6
Germany	6.6
Ford	6.6
Total Peripherals	6.6
Compa	6.6
Toshiba	6.6
Amia	6.6
Ames	6.6

	0	20	40	60	80	100	Index
General							7.9
Control							8.7
Picture							8.7
Sound							8.5
Overall							8.5
Connectivity							8.3
Design							8.2
HE							8.2
OS/Options							8.2
Performance							8.2
Control							8
Picture							8
Connectivity							8
Design							8
OS/Options							7.8
Performance							7.8
Control							7.7
Picture							7.7
Sound							7.7
Overall							7.7
Connectivity							7.7
Design							7.5
OS/Options							7.5
Performance							7.1
Control							6.9
Picture							6.9
Sound							6.9
Overall							6.9

OSBORNE have worked for many years with the worlds leading monitor manufacturers to design a monitor that exactly suits Australia's very different ambient light and magnetic field conditions.

The results of this research work can be seen in the results of the latest survey on user satisfaction with monitors conducted by Australian Personal Computer Magazine and reproduced opposite. Although Philips is one of our monitor suppliers the **OSBORNE** variations on the original Philips design improve the performance of the unit.

Similarly we have worked with MAG Electronics to modify their design to work much better in Australia and by using better quality components than in the original specification we are able to significantly outperform the generic MAG unit.

The buzzwords such as SVGA/Non interlaced/at least 72MHz/Green/MPRII etc, have very little meaning in determining the quality of a display monitor. All but the very poorest quality monitors could, probably, be described by those buzzwords and yet the size, quality and linearity of the displayed images vary enormously.

OSBORNE monitors incorporate the latest 15" flat/square tube and are fully digitally controlled (digital controls give a much more precise image than is possible using analogue controls). The tube and yoke have been manufactured for the Southern Hemisphere magnetic fields and the 'colour' selection has been modified to take into consideration the much brighter ambient light conditions of the Australian continent.

When you purchase an **OSBORNE** computer system the monitor you receive is exactly balanced to ensure that your systems overall power is fully useable by you and the effects of eyestrain are considerably reduced.

The Best Video Chipset

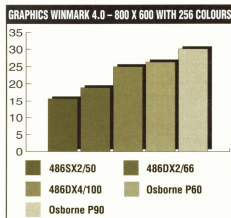
An excellent monitor is a key requirement for the display of your data but an equivalently excellent video control chipset is just as important for you not to be constantly held up waiting for the results of your work to be displayed.

OSBORNE Gold Series computer systems use the very latest, and the very fastest video control chipsets available. The three Gold Series Intel 80486 systems use the new 64 bit version of ATI's Mach Series of controllers that, collectively, have won over 30 Editor's Choice and Best Performance awards in the USA over the past 2 years.

The use of a 64 bit data path between the controller and your monitor display allows data to be transferred at up to 3 times the speed of old 32 bit technology. ATI's firmware and software drivers remain at the forefront of video technology and the ATI Mach 64 chipset used in Gold Series VESA (2) systems provide the fastest video available on any 80486 system.

On **OSBORNE** systems containing Pentium™ microprocessors, (both 60MHz and 90MHz) Diamond System's latest 64 bit Stealth card is integrated with the latest version of the PCI bus to optimise the speed of the Pentium microprocessor. On these systems we use 2 megabytes of dedicated video memory to allow the Pentium microprocessor to communicate at its optimum transfer rate to the video controller.

For both the VESA bus 486 systems and the PCI bus Pentium systems we have selected the very highest performance video control chipsets available that are optimally integrated with the other sub system control chipsets to deliver you the most powerful video system available anywhere in the world.



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The Best Processor

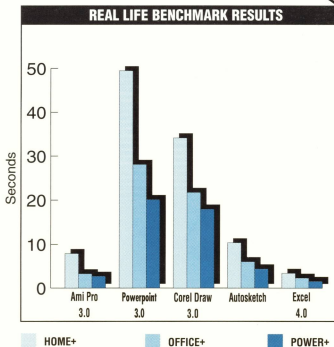
Designating a computers likely power by the selection of a CPU type and speed is not very sensible. All systems containing either a 486 or Pentium™ chip do not produce the same level of performance. In fact, apparently 'similar' systems can vary by up to 300% in deliverable power on software applications.

The amount of useability you will get from the CPU in your computer system is determined by the effectiveness of the CPU control chipset that links the CPU to the bus, cache and direct memory and the quality of the firmware (BIOS) that controls the instruction paths.

OSBORNE computer systems use highly optimised ASIC's (Application Specific Integrated Circuits) that have been developed and refined over many years to control and optimise the power of the CPU. Similarly **OSBORNE** uses a highly optimised version of a Phoenix developed BIOS to control the CPU subsystem.

The result of these years of development (we do not use 'off the shelf' components) is that your **OSBORNE** X86 or PXX will deliver more of it's available power than other products on the Australian market.

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2 consecutive years



*Real Life Benchmarks display the time taken to perform a wide variety of tasks on 5 of the most commonly used packages.

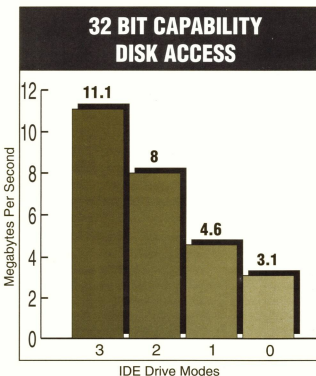
The Best Disk Access

All the main hard disk manufacturers make similarly performing disk drives in terms of their rotational delay and physical access times. The difference in the 'quality' of drives made by the major manufacturers is, virtually, undetectable and the difference in failure rates and times between different brands is almost non existent.

However the difference in performance as measured by the speed at which data on the hard drive can be made available to the CPU for processing can be up to 10 times faster depending on the type of drive controller on the drive and the capability of the disk control chipset on the motherboard of the computer system. The amount of cache on the disk drive itself can also be a factor.

OSBORNE computer systems only use Mode 3 hard drives which as can be seen from the chart opposite provide you with transfer speeds of up to 11mb/sec. We also use the latest CMD disk control chipset which includes the control of Logical Block Addressing and conforms to the new Enhanced IDE specification.

When you select an **OSBORNE** computer system your data will move to and from your hard drive as fast as current technology makes possible and up to three times faster than most other systems on the Australian market.



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*Pentium™ is a trademark of the Intel Corporation

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PCI Graphics

This graphics accelerator offers spectacular performance with Winmark 4.0 at 22.5M and up to 1280 x 1024, 256 colours or 800 x 600, 16M colours.

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Microsoft Windows
Mitac Mouse
DOS 6.2

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MULTIMEDIA NEC VERSA M

NEC has combined the release of the latest in its range of award winning notebooks with the announcement of a strategic alliance with multimedia presentation specialists Harrow Media. Flaunting many new features, the Versa M series is set to redefine the multimedia requirements for multimedia road warriors.

To date the Versa series of notebooks has been at the top of their class: The Versa /33C winning APC's best product for 1993. In this issue the Versa S, released in August, ties with the T1910 from Toshiba for an editor's choice in our "Notebooks under \$3500" story on page 70. According to Norm Hall from NEC the notebook market is extremely volatile and in response to competition from Compaq, Toshiba and IBM, NEC has cut prices across the Versa range from 12 to 21%. The ongoing success of the Versa is reflected in its sales figures. In the first quarter after the release of the Versa two and a half years ago, NEC sold 400 units. Now they are selling 4000 units a quarter. This, according to NEC, corresponds to a 30% share of the high quality TFT market.

With two new twisted film transistor (TFT) 9.5in. screens the Versa M series is the first to offer configurations with either 24-bit true colour or high resolution internal displays.

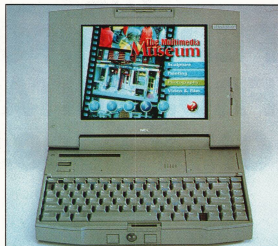
Using a 24-bit graphics accelerator the true colour screen can display up to 16 million colours at a resolution of 640 by 480; most colour notebooks peak out at a shallow 256 colours. The realism and brightness of the screen make this an ideal notebook for video presentations and training simulations, especially in situations where an external screen would have been unavailable or impractical.

Equally impressive is the high resolution TFT screen which can display an internal resolution of 800 by 600. Capable of displaying 256 colours in the hi-res mode, the screen can hold 50% more information than a standard 640 by 480 display.

Also available are the enhanced DSTN and TFT Full Colour screens which can support 65,536 colours at a resolution of 640 by 480. With the inbuilt modularity of the Versa notebooks all screens are upgradable to the full colour and hi-res displays — this is not possible for the True Colour screen as they require the internal 24-bit graphics engine. Boasting many of the modular features that have made the Versa range successful, the M series can

accommodate two PCMCIA Type II cards, the Docking Station II and Versa Packs for a range of add-on options. With a quick BIOS upgrade the Versa M range will be compatible with future releases of the Plug and Play standard.

The sound system is capable of 16-bit playback and recording at rates of 44.1 KHz. For most applications the inbuilt microphone and speaker are adequate —



The Versa M series: first to market with an 800 by 600 notebook display, or 24-bit colour.

for use with more sophisticated equipment, two 3.5mm audio sockets are located at the rear of the unit.

With an extremely tight release schedule, NEC was able to provide APC with a sneak preview and a chance to benchmark the Versa M75 24-bit True Colour notebook. The tested unit was equipped with an Intel 486 DX4 processor running at 75MHz and 16M of RAM. Standard across the range is 8M of RAM which is easily upgradable to 40M using user-installable RAM cards.

Expect to be impressed — we were.

With a DX4 CPU the unit returned a respectable processor score of 34.71. For even better performance look out for models based around the Intel DX4 100MHz processor with 128K of level 2 cache. Not yet released but on the horizon will be speed demons based around the low power 75MHz Pentium processors. With an excellent disk harmonic of 908, the DOSMark score of 536 is in line with cheap 486DX4/100 desktop units. This is the second highest DOSMark score that we have recorded for a DX4 notebook — a top

score of 636 goes to Texas Instruments for the TravelMate 4000M.

The Versa M series uses NEC's latest BitBLT graphics accelerator with 1M of Video RAM located on the local bus. With 24-bit colour — 16 million colours — we expected the Windows graphics subsystem to be reduced to a snail's pace — a result of 2.45 proved us wrong. This is about half the speed of other DX4

notebooks using 8-bit colour — 256 colours. When we reduced the colour depth to 256 colours the Graphics Winmark shot up to an astounding 12.8. This is nearly twice that of the Versa E which had previously held the top score of 6.5 with the Compaq Elite and AST Ascentina. At a Full Colour, 16-bit, depth of 64K colours the unit scored a Graphics Winmark of 9.74.

With efficient use of a 64K hardware cache the 340M IBM hard drive returned a Disk Winmark of 830. This is the second highest score for this class of notebook — the Toshiba 4800CT with a score of 1240 still holds the top place. These drives are easily removable and user upgradable to 810M.

Tuned for the Windows environment, the Versa M is holding poll position in its class with a Winstone score of 45.9, at 256 colours. When we increased the colour depth to 16M colours the Winstone score dropped to 37.1, which is an impressive score.

With a three year warranty and one year of UltraCare international warranty, the Versa M series is ideal for powerful on the road presentations with a data display that doesn't need an external monitor or audio system.

Stuart Bowman

*Multimedia NEC Versa M
Distributor: NEC Information Systems
Phone: (02) 868 1811*

Price: Versa M75TC, True Colour, 340M, \$10,242; Versa M75HC, Hi-Res, 540M, \$11,007; Versa M75C, TFT Colour 340M, \$9,663; Versa M75D, Enhanced DSTN, 340M, \$8,227.

In short: Offering the latest in notebook screen technology, NEC has placed itself in a unique position with a monopoly on high performance and quality multimedia notebooks.

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NETSCAPE

Hypertext browsers are the Internet access tools of choice. NCSA Mosaic and similar World Wide Web clients like Cello, Winweb and the new Air Mosaic have replaced the awkward Unix command line with a graphical interface, bringing Internet resources into the hands of everyday PC users.

Trouble is, everyday PC users tend to have everyday Internet connections and using these tools can be a very slow process, particularly if the document accessed contains a few large graphics.

Netscape attempts to solve this problem by allowing users to interact with documents while they are being loaded, rather than waiting for the entire document to be completely transferred before it is displayed — text is retrieved in no time at all, appropriate space is reserved for each graphic and the pictures appear in bands as they are downloaded. Therefore, a 10-page article with a graphic on the top of each page can be read while the pictures load, then the user can backtrack and soak up the visuals.

Just as importantly, this means links to other documents can be accessed instantly. One of the most annoying things about previous Web browsers was waiting for an entire document to load, pictures and all, then finding that the required information was to be found by clicking on a link to another page.

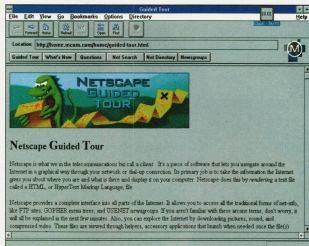
This makes for phenomenal improvements over previous browsers, which sat idle until all data had been received. Netscape is optimised for 14.4Kbps modems, but can give users the impression they are dealing with something faster.

The company responsible for this software is Netscape Communications Corporation, run by Silicon Graphics founder Jim Clark and Marc Andreessen, creator of the original Mosaic at the University of Illinois. The company initially called itself Mosaic Communications Corporation, but after legal objections from the University, the name Mosaic has been dropped. As *APC* goes to press, it is reported that a settlement is being negotiated out of court.

Like its rivals, the initial version 0.9 is considered to be in beta testing and therefore available to individual, academic and research users for free public download from Internet FTP sites such as the windows archive mirror at <ftp.cc.monash.edu.au>. Windows, Macintosh and X Windows versions

are available. Commercial users can purchase supported, licensed copies from Netscape Communications, starting at \$US99 per user.

Interestingly, instead of providing a Windows help file within the software, Netscape Communications has constructed a very high quality World Wide



Netscape's help files are located on the company's World Wide Web site.

Web site (<http://home.mcom.com>) that contains comprehensive instructions, a FAQ (list of frequently asked questions) and dozens of other resources — including a link to "The Amazing Fish Cam", a camera which takes an instant picture of a fish tank in the Mosaic Communications office and sends it to your viewer. I lost a few hours watching the progress of brightly coloured tropical fish around a rock.

A button bar across the top of the screen allows instant access to these links.

Despite the fact it's in beta, Netscape is much more stable than other Windows browsers I have used. It has a good caching system and much friendlier menus than NCSA Mosaic. The interface and display are attractive, file transfer rates are good and there is no annoying "load to disk" option to remember to select before downloading (a dialog box simply asks if you want to save the file to your hard disk).

But sometimes Netscape 0.9 fails to connect to a selected link, idling for far too long without an error message while accessing the hard disk for no apparent reason. Fortunately there is a very effective "stop" button on the screen, but occasionally this problem becomes more fre-

quent, forcing the user to close the program and restart. It was very rare for the program to crash completely.

A basic, friendly e-mail application is included, but lacks text wrapping. And as Netscape includes native JPEG support, pictures can usually be displayed instantly without the need for a third-party viewer (though it is possible to nominate one).

Another clever feature is that the user's hostlist of "bookmarks" is stored in hypertext format instead of being part of a Windows initialisation file. This allows the bookmarks to be opened as a document that works just like any other WWW page.

Using the rather awkward menu-editing tool, a very well-constructed index of hot links can be created and there is a conversion facility to translate old Mosaic hostlists into Netscape bookmarks. Hostlist files can be swapped with friends. Fiddling with *mosaic.ini* files may have been eliminated, but the user must still enter many options in a range of menus before Netscape will function properly. Some of these will still be rather difficult for beginners and the online help files lack specifics in several areas.

The company says the final version, due to have been released by the time you read this, will remain free of charge for individual users and encompass security features such as encryption and server authentication. Also planned is a Netsite Commerce Server for the provision of online publications, financial services and interactive shopping. In the USA, Netscape has teamed up with First Data Corporation to develop a credit card payment system that can be offered by purchasers of the server software and uses encryption to protect the sensitive data involved.

Netscape is the most advanced World Wide Web browser yet made available to the public and is being very quickly adopted by the Internet community. As we await further commercial Web browsers, Netscape seems to have set a standard the others will find tough to match.

Simon Vandore

*Netscape
Distributor: Netscape Communications
(available for download on the Internet)
Price: Freeware (\$US99 for commercial
uses) for version 0.9.
In short: A step forward for the World Wide
Web and Internet users in general.*

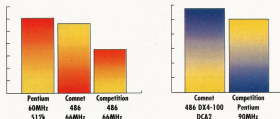
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DIAMOND'S VIPER PRO VIDEO

With the release of its \$1,499 Viper Pro Video accelerator card, Diamond Multimedia Systems is the first vendor to provide a video and graphics controller that takes full advantage of the new Display Control Interface (DCI) developed by Intel and Microsoft. This interface makes possible a high performance graphics card

that can playback realistic video in any size window.

The 4M version of the Viper Pro Video board we tested (using WinBench 4.0 in a 486DX2/66 PC) achieved a Graphics WinMark score of 10.9 million pixels per second at 1,024 by 768 resolution in 32-bit colour mode (16.7 million colours) and a score of 13.1 million pixels per second at

1,024 by 768 resolution in 8-bit colour mode (256 colours). These scores place the Viper Pro Video firmly in the upper echelon of graphics card performance for this system.

But the Viper Pro Video, which relies on the Weitek P9130 video accelerator chip, goes beyond graphics to play video. The combination of video-acceleration hardware and DCI-compliant drivers allows the board to perform colour space conversion, image scaling, and pixel interpolation.

What you'll notice is the card's ability to display full-screen video. Non accelerated playback of a 320 by 240 resolution, 24-bit video clip on a 486DX2/66 system can slow to frames per second (fps) when the images are displayed at even twice their

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Model No	Screen Size Dot Pitch	Horizontal Frequency	Max. Resolution	Microprocessor Control	Power-saving (EPA+VESA)
SRC-1451	14" 0.28mm	30-38KHz	1024 x 768(I)	No	Yes
SRC-1452	14" 0.28mm	30-38; 47-50KHz	1024 x 768(N)	No	Yes
SRC-1405	14" 0.28mm	24-50KHz	1024 x 768(N)	Yes	Yes
SRC-1501	15" F.S. 0.28mm	30-64KHz	1280 x 1024(N)	No	Yes
SRC-1502	15" F.S. 0.28mm	24-64KHz	1280 x 1024(N)	Yes	Yes
SRC-1702	17" F.S. 0.26mm	24-82KHz	1600 x 1280(N)	Yes	Yes
SRC-1703	17" F.S. 0.28mm	24-64KHz	1280 x 1024(N)	OSD	Yes
SRC-2002	20" 0.28mm	24-82KHz	1600 x 1280(N)	Yes	Yes
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Speed is not sacrificed at the expense of playback quality, which was exceptional, especially when using files compressed with Intel's new Indeo 3.2.

normal size. In contrast, the Viper Pro Video can stretch the same clip up to four times its normal size, while maintaining its full-frame rate of 30fps.

Speed is not sacrificed at the expense of playback quality, which was exceptional, especially when using files compressed with Intel's new Indeo 3.2. The card also works well with a variety of video formats, including M-JPEG, Cinepak, Video-1, and older Indeo 3.1 files. According to Diamond, full-screen MPEG playback will be supported eventually, although the drivers that we reviewed were unable to support MPEG. Although the Viper Pro Video card doesn't offer special connectivity to standard video input devices, it does include a runtime version of Video for Windows 1.1d, a suite of updated video CODECs, and the DCI drivers.

Jon Hill

Diamond Viper Pro Video

Distributor: Chips and Bits

Phone: (03) 696 1911

Price: \$1,449

In short: As an integrated graphics and video product, the Viper Pro Video provides a glimpse of the future of video on the PC.



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5811 ALTP00007

BOORNE SPIRIT SMI + VOICE MODEM

One recent development which seems to be gaining selling points in the small office market is the multi-data modem. Rather than simply offering standard data and fax transmission and reception, the newest units offer voice handling for analog phone calls as well. The most recent offering in this total phone solution market comes from Mike Boorne Electronics in the form of the Spirit SMI modem with voice capability.

Unlike many of the alternatives which use hardware switching solutions and firmware configuration for their modulation and demodulation, the SMI approaches the problem totally differently. It uses Digicom's SoftModem approach to signal processing. SoftModem goes away from the majority trend of using a dedicated modem chip such as the Rockwell AT. Instead it uses a programmable digital signal processing chip (DSP) from Analogue Devices. Although possibly not so accurately targeted at the requirements of modem operation, the big plus from the user's point of view is that the DSP chip is configurable to whatever the software tells it to do.

Consequently, although DSP chips can be used for sound, video, or other analog to digital signal processing, they

can also be used as a modem processor. The DSP modem maker's other advantage is that, thanks to the reprogrammability of the DSP, it can be instructed to take account of new developments.



Configuring the voice system is point and click.

This means upgrades are only a matter of loading new drivers; a DSP-based modem is capable of being upgraded in terms of speed and capability, not by hardware or EPROM swapping, but simply by loading new software from disk or a BBS service.

The downside to this system is that the DSP has to be given its working parameters every time it is used. This can simply be set up via the standard autoexec.bat file, or instigated every time a particular comms program is loaded. The SMI manual says this takes less than 100ms; not a particularly big time overhead and one which is taken care of automatically when the install software is loaded.

The SMI comes as standard with V.32bis, V.32terbo and Group 3 fax capability on a standard 8-bit half length card. It has a noticeably lower chip count than many comparative fax modems. Configuration is a matter of setting the IRQ and COM by simple jumpers and DIP switches, although this would be easier if software configuration was available. The defaults presented no installation problems, and once the two floppies were loaded, the modem was recognised by the system. Enabling the Windows configuration software required a

separate install operation as the built-in Windows setup software routine proved less than foolproof. Manuals are simple yet useful.

Once loaded, the software driver parameters can be set to suit your individual software. A good range of pre-written drivers is supplied for all major comms and fax programs, and setting up custom drivers is also straightforward. Loading the Ring Central voice handling software is also reasonably easy, providing you ignore several seemingly irrelevant dialog box questions — answer them and you may get error messages galore.

Ring Central presents a simple interface which links into the phone system, and

uses the handset as the sound recording and output device. The advantage of this is that replaying messages is kept confidential, but the downside is that you may miss calls while the stored messages are being replayed; provision for external playback would be useful. The VCR-like system seemed to work very well, with a range of prerecorded messages, options and alternative mail boxes available for tone-phones users. Remote access, auto call forwarding, auto fax reception and message recording are all built in and easy to use.

Performance wise, the SMI includes MNP5, and is built to work with UARTs up to 16550 to improve throughput. Using V.32bis, we logged on to our local BBS with no problem at 19,200bps, although line negotiation seemed to take up to 18 seconds before finally establishing a connection on some occasions. No MNP10 is included, but DOS-based QModem and Winfax Lite are included in the package.

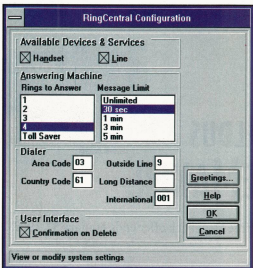
Jeremy Torr

Distributor: Mike Boorne Electronics

Phone: (02) 416 3014

Price: \$399 (modem), \$99 (+Voice software)

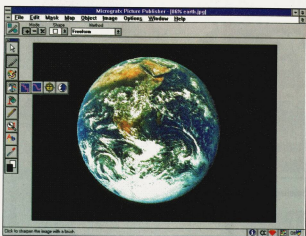
In short: Overall, a simple and convenient data solution for the single-line office, with good speed and message handling capacity at reasonable cost.



Ring Central's VCR-like message centre.

PICTURE PUBLISHER 5.0

Every update of Micrografx Picture Publisher has a few new tricks up its sleeve, and Version 5.0 (\$795) is no exception. Combined with a variety of catch-up additions and interface enhancement, PP5's set of new found capabilities — such as editable command stacks — render Picture Publisher an even more formidable image-editing program than ever before, and potentially the most flexible product in this market.



Picture Publisher 5.0 provides extensive control of 4-colour film creation.

The Command List idea is simple but yields extremely powerful results: As you work, the program tracks each individual operation — including brush strokes and transformations — and saves the commands and parameters as a small file. At any time, you can view the list of operations and reorder, delete, or undo any of them. You can even save the Command List of operations done to a low resolution image as a macro and apply the operations to a higher-resolution version of the image.

Near limitless versatility

The Command List allows flexibility that goes beyond the mere Undo functions of other programs. For instance, one complicated image we created required several operations, including an unsharp masking, a saturation increase, and the application of special effects.

We were able to backtrack and change the colour saturation after applying a special effect, then reorder the operations in the Command List and let Picture Publisher rebuild the image with the new parameters. Alternatively, we could have inserted new operations into or taken existing operations

out of the Command List at any point, creating a different final image. Working on a 100-pixels-per-inch (ppi) file, we generated a macro to create a Chroma Mask, manually tweak it with the image mask, change the background fill, and add brushstrokes around the central image; we then played the macro back on a 200-ppi version of the image with excellent results.

While it opens up some intriguing possibilities, the Command List concept falls short of perfection. There's no easy way to automatically discard undesired groups of operations from the Command List or to collapse the stack. Nor does the program handle slider-based functions very well. For the low-resolution processing of a high-resolution image to work, you need to create your macro on an image with a resolution that is a multiple of the resolution of the higher-resolution analogue. And finally, every time you reorder the stack or undo beyond the last step, Picture Publisher regenerates the image from scratch, yielding long rebuild times.

Catch-up

You can finally create and edit masks using Bezier curves (you can use Bezier's to edit curves in mapping dialogues), and import Adobe Illustrator EPS paths as masks. The latter capability isn't documented or implemented as well as it should be, however. The Load Shapes command is only available from the right mouse-button menu when the Freeform mask or Edit Points modes are selected, a fact that isn't noted in either the printed or online documentation. We also experienced problems getting EPS files to import properly. Another substantive improvement includes better object handling, which is now available with one click of the right-button menus.

While some interface changes are obvious (such as the ability to create custom floating palettes of tools, commands, and macros), others are more subtle. These include larger preview thumbnails in some of the dialog boxes, less distraction monochrome icons for working on greyscale images, the ability to escape out of most operations, and improved support for Kodak PhotoCD.

Picture Publisher ships with the Kodak Colour Management System. The Kodak system includes profiles for a limited number of output devices, and most of them are high-end. More useful is the addition of a system for visually matching printed output with screen display — a less high-tech but easier to control method for the low-end user.

An interactive tutorial and an online help section targeted specifically at Adobe Photoshop users make it easier than ever for new users to learn how to use the product. Performance is similar to the previous version of Picture Publisher (at least, it was on our 486DX2/66 PC with 28M RAM and an ATI Graphics Pro Turbo video card).

Lori Grunin

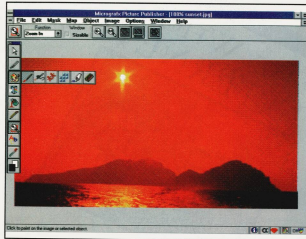
Picture Publisher Version 5.0

Distributor: Micrografx

Phone: (02) 415 2642

Price: \$795, upgrade \$245.

In short: Picture Publisher 5 is a must upgrade for present users. Current Photoshop users may find some of this powerful image-editing package's capabilities tempting as well.



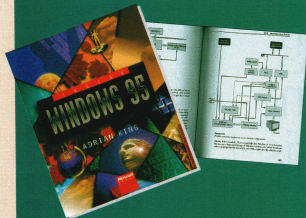
A large stock-photo library and a tutorial are with Picture Publisher 5.0.



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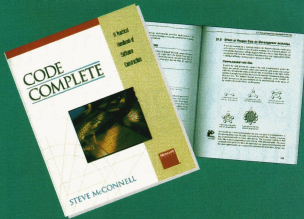
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LAPLINK FOR WINDOWS

These days file transfer programs seem like superfluous baggage when operating systems are offering all the bells and whistles that were previously the domain of the third-party developers. So when Traveling Software, makers of the famous LapLink series of file transfer programs, released LapLink for Windows, one would assume that something special was on offer.

The program comes on two disks and installs as any conventional Windows program does. During install the portents of the new version become known. File transfer is just one of the functions provided by the package. Remote control and a chat facility are also supported; and can be enabled through cable, modem, land network or even wireless.

The cables are even provided for con-

venience. We tried the parallel cable and completed a transfer from a NEC Versa Slimline notebook to a IBM PS/Value-Point of a directory of 15,872,195 bytes in 10 minutes and 30 seconds, a creditable performance. Perform the copy by using the menus, smarticons or drag and drop the tagged files onto the remote drive. Over the parallel line that was a throughput of an average of 202,000 baud. Try doing that through floppy disk! With the supplied null modem serial cable the transfer rate was a bit more modest of around 102,000 baud, taking 21 minutes 21 seconds.

Over a modem connection there was a drastic drop in performance. We tried it with a Microcom DeskPorte FAST con-

The beauties of LapLink are self-evident. At all stages of file transfer you can see what the status of operations are.

nected to a 386DX/33 and the NEC Versa S with a DYNALINK PCMCIA modem. Both modems were set to the lowest common denominator, in this case the 14,400 baud Dynalink where we achieved a mean throughput of around 19,000 baud but the line did drop down at times to 14,000. The transfer of a directory with two subdirectories of 1,164,165 bytes took eight minutes, four seconds.

The beauties of LapLink are self-evident. At all stages of file transfer you can see what the status of operations are. There is a sliding scale showing what percentage of the transfer has occurred and what the transfer rate is. Two window panes display the transferor and transferee drives. There might be some preference to using local and remote drive nomenclature as it is possible to mistake one for another. If the default settings are not to taste then you can reconfigure.

LapLink for Windows has a file replication facility they call SmartXchange. By default, when SmartXchange is enabled files are synchronised between machines — the older version is overwritten by the newer. You can make it a one-way transfer or bi-directional. The growing number of multi-computer users will lick their lips at the prospect of file synchronisation made easy. There is also SpeedSync which is

This accounting package lacks one thing... compromise!

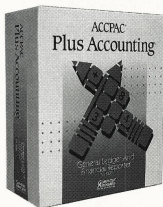
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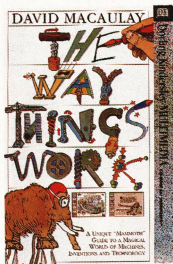
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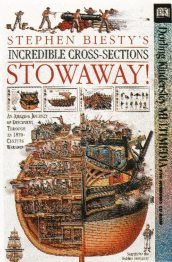
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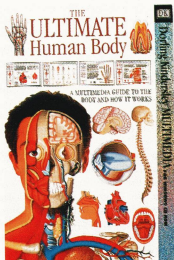
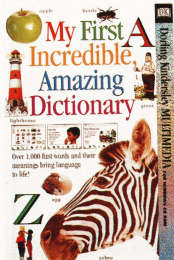


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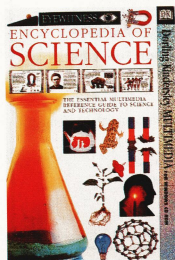


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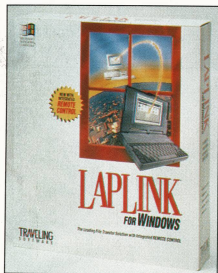


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LapLink: Trouble-free file transfer.

used to update those files that are changed and only those parts that have changed.

Online chat is available at any time. Open a chat window during a file transfer if needed. As far as could be seen, file transfer performance did not degrade while a chat session was in progress. Remote installation is possible like the older versions of the software. The install on the remote machine must be commenced in DOS and performed over a serial link.

Though there is nothing but praise for the way LapLink handles the business of file transfers the same can't be said for remote control. The Windows interface put together by Traveling Software does not make enormous use of icons, appearing a bit cluttered in some menus, making the user hunt for changes to optional settings. Sadly a game of Solitaire was aborted when the modem lost its way. A less graphically intensive application might be more suitable for remote control. We did not try wireless connection so we can only surmise the effectiveness of using this method.

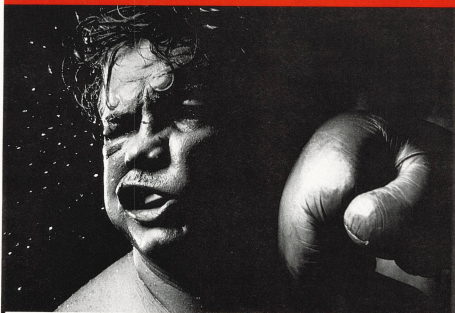
LapLink will become a favourite with those users who need rapid, trouble-free file transfer. Portable users and technical support professionals immediately come to mind. Some might even be tempted to push the software to its limits and substitute a peer to peer network with LapLink for Windows.

David Lin

*Laplink for Windows
Distributor: Traveling Software
Phone: (02) 686 3589*

*Price: \$269; upgrades (02) 905 9608
In short: As long as you are aware of the shortcomings we found in remote control and tackle only as much as you can chew, life with this version of LapLink will be a bed of roses.*

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WINFAX PRO FOR NETWORKS 4.0

The new version of Delrina's Network Fax package — WinFax Pro for Networks Version 4.0 is suitable for IPX and NetBIOS networks and can use over 600 fax modems including generic Class 1 and Class 2 devices.

The product is aimed directly at the workgroup and department, where users join a fax workgroup that can support up to 16 modems. Essentially, this is a networkable version of the standalone WinFax Pro Version 4.0 and, thanks to this background, has many strong features.

Installation and configuration of the program are far from perfect. Both the server and clients require a series of TSRs to be loaded. The installation program configures these TSRs to the users specific modem and settings but doesn't add a load statement to the autoexec.bat file or reboot the PC. Additionally, when configuration changes must be made, the TSRs must be unloaded, the alterations made and then the TSRs reloaded. This involves booting the machine at least once and exiting Windows twice — not the easiest procedure.

During installation both the network and mail system in use are automatically detected. Popular mail packages including MS Mail (MAPI), cc-Mail (VIM) and MHS compatible products are all supported, allowing faxes to be routed through the e-mail system.

The package also supports automatic fax routing by way of DID, DTMF and CSID and faxes can be manually forwarded to WinFax Pro clients from the user set up as fax receptionist. The WinFax Pro server, as well as supporting in-bound routing, can be configured to automatically print, view,

OCR convert or notify the user on receipt of a fax. WinFax Pro can even be configured to forward your faxes to another fax machine if you desire.

Once installed, WinFax Pro is easy to use and has a strong feature set. Faxes are simply sent by printing from any Windows program to the fax driver. This automatically launches WinFax Pro. Users can

these historical records by subject, destination, date, keyword and other criteria.

The fax viewer allows the user to preview outgoing faxes, view incoming faxes as thumbnails and rotate faxes if they have been sent upside down. Users can remove unwanted noise and sharpen the image using the aptly named Fax Vacuum. The viewer also allows faxes to be exported in a number

of formats including TIFF, PCX, BMP or FTS (WinFax native) formats. Document revision is also possible through the array of annotation tools provided. There is no need to print out incoming faxes — mistakes, graphics and text form just a part of the possible range of on-screen responses.

Optical Character Recognition (OCR) is provided and works well for common text. The OCR viewer allows the processed fax job to be easily proofed. A split screen displays the original area of the fax in one half of the screen and the text as converted in

the other. As you scroll through the converted text, the original fax area converted is automatically displayed.

To add the personal touch to your correspondence, this version of WinFax Pro for Networks ships with "Cover your fax". This provides 101 pre-designed fax cover pages from the conservative to the moderately amusing. A design utility is also included to allow users to design their own fax cover pages complete with variable field data.

WinFax Pro for Networks' strengths lie in its use of WinFax Pro Version 4 client interface. Installation and configuration are not ideal but the features expected of a network fax program are all present.

Ben Gerholt

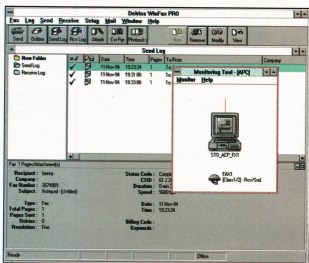
Winfax Pro for Networks 4.0

Distributor: Bitware

Phone: (03) 532 2274

Price: Server and 2 users \$695, Server alone \$299, 5 users \$795, 10 users \$1,495, 25 users \$3,155, 50 users \$5,995.

In short: Delrina's network package supports in-bound routing, scheduling and up to 4 fax modems per server on IPX and NetBIOS networks.

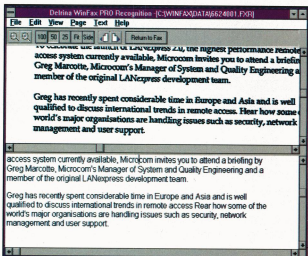


The OCR viewer allows context sensitive on screen proof reading.

choose how and when their faxes are sent; specific modems can be selected, the first available modem used and faxes can be scheduled for off-peak times to reduce call charges. Group faxing is possible and, to speed transmission, group jobs can be shared among the available fax modems.

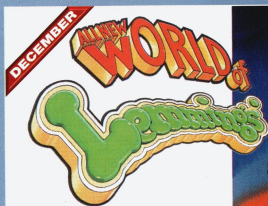
The program has advanced contact management support with an internal directory as well as the ability to work with a host of database and personal information management (PIM) programs including ACT for Windows and Pack-Rat. These databases can be read directly or imported into the WinFax "phonebook".

Document management features have been included in Version 4.0, including the ability to store faxes in folders for future reference. The WinFax Pro search engine allows queries of



Keep tabs on fax status with the send log and workgroups server monitor utility.

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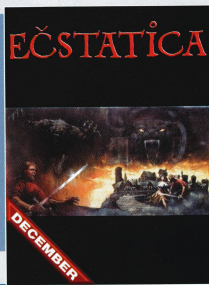
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XTREEGOLD 4.0 FOR WINDOWS

XTreeGold for Windows, the \$99.95 file manager and viewer from the Central Point division of Symantec Corp., is a strange mutation. Central Point is billing it not as an upgrade to XTree for Windows but rather as a specially designed for Windows version of the popular DOS-based XTree-Gold program.

What that means is that just about every keystroke combination from the DOS version also works in this Windows version. A toggle allows you to use traditional Windows File Manager-like commands if you would prefer to do so.

Like the File Manager or any of several other File Manager replacements, XTree Gold exists in order to help you keep track of, manage, and view all the files on all of your PC's disks and network drives. For basic file management — copying, moving, erasing, unerasing, archiving, and the like — it's as good as anything on the market.

New to this version are two features that can speed up your file management.

The first, SmartTabs, provides a way to save different views of file lists so that you can show deleted files only, or show files with the viewer open. The second feature, File Companions, is a useful add-on menu that appears in all Windows File Open and Save As dialog boxes. From the menu, one click allows you to copy, move, rename, delete, compress, or view files, or to format a disk or activate XTreeGold's SmartFind search tool.

XTree Gold 4.0 includes viewers for over 40 file types, including 10 vector graphics formats. (These are the same viewers that you will find in CentralPoint's PC Tools). In our experience, most of the viewers worked well, but some of the word processor viewers were surprisingly slow to scroll, and they yielded inaccurate output when we printed from them directly.

Don Willmott

XTreeGold 4.0 for Windows

Distributor: Symantec

Phone: (02) 879 6577

Price: \$165

In short: The XTreeGold package is already equipped to handle long filenames, so it will most likely continue to prosper as long as overcrowded hard disks continue to exist.

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21C ballerina

The Federal Government made much in its Creative Nation initiative about multimedia. And CD-ROMs are, of course, the main delivery medium for packaged multimedia. Some wags have suggested that Paul Keating wanted to be seen as the father, at least in Australia, of a high tech art form. Multimedia may be the opera or ballet of the 21st century, but I don't think so. Neither do I believe that Mr Keating is so naive.

The government support for multimedia does two things. It raises the profile of multimedia. Suddenly metres of newspaper and magazine columns in the general press are devoted to explaining what multimedia is (or at least what some writers think it is).

At the same time it shows that the government is doing something about technology and the arts and how they are interacting.

While Mr Keating has a fine eye for an antique clock, I doubt if he is much of a connoisseur of multimedia. Undoubtedly there are people around who really understand multimedia but they number in the tens, not the hundreds, worldwide.

How do I know this? It's very simple. Take any 10 multimedia CD-ROMs and run them. Is there anything you see that is as appealing as, say, *Star Wars* or *Priscilla, Queen of the Desert* or *The Wizard of Oz*? (These are, incidentally, not my favourite movies but they are all well made and draw on very different cultural backgrounds).

Even if your taste in movies is different, you must admit that no multimedia products rate against these titles. They don't hold your attention or your emotions in the same way as a good film does.

Again the reason is simple. We are in the infancy of this medium. It took film makers more than 10 years to come to grips with the movies. D.W.Griffith was making movies for nine years before he made the first feature films, *Birth of a Nation* and *Intolerance*. Multimedia is an even more complex medium.

It is going to take more than 10 years of serious multimedia development before we even understand what the medium can do.

But I am sure that when we do find out what it can do, the resulting productions will be more compelling, more interesting and more stimulat-

ing than any TV show and all but the very best films.

This is because they will combine not only sound and video but text and interactivity as well. What a multimedia production loses in not being on a large screen that fills the viewer's field of vision, they make up for because they are interactive.

This interaction with the work should make multimedia more engrossing. However, we have still to learn the tricks to make this really work.

Some observers are questioning whether a CD-ROM industry is viable. CD-ROM is not an ideal delivery mechanism for multimedia. It is too slow and doesn't have enough capacity.

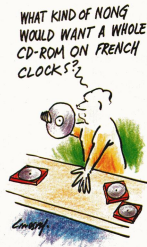
However, until we have a high speed digital information infrastructure, it is the best solution. It is cheap. There is a growing number of drives among the user population. It does not take a genius to see that CD-ROM has a limited life for multimedia. Also, it does not take a genius to see that both the multimedia and CD-ROM markets are over-hyped at the moment.

However, it is best not to let this hype blind you to the fact that there is real growth in this market. In the short term, companies investing in multimedia have a better chance of making money than those who invest in the first services for the information superhighway.▲



BY JEREMY HOREY

By the time you read this, some of the hype around multimedia and CD-ROM will have died down.



Dear Santa...



BY HELEN DANCER

When writing a Christmas wish list, it's always best to deal directly with the man at the top.

Dear Santa (or should I say Santa94?). What a year! You promised us all a bunch of what your chief elf Bill would call way cool neat stuff, and what happened?

What happened is that when you get down the chimney at my house this year, there's going to be a bag of stuff I collected for you to take back with you. When I asked around, plenty of people were more than happy to contribute to the pile of duds you brought us last year. David Henderson from Toshiba is sending you back as many PDAs as he can lay his hands on, with a little note attached acknowledging that — oh well, it's the thought that counts. And the airport-hopping MD of Recognition, Steve Townsend, is shipping back a rucksack full of add-ons and the notebook that goes with them. Either put 'em all in together for Steve, Santa, or don't bother, okay?

Our technical guru Ben Gerholt offered to hire a truck to send over all the stuff he wanted to give you back — they included DOS 6.x, with its doublespace/smartdrive and compression problems, along with the people who, instead of providing a patch, shipped it as an upgrade and tried to charge \$20 for the privilege, but I told him you were a recycling kind of guy, and you'd probably just foist them onto someone else instead.

Novell WordPerfect's Leonie Cridland assures me that your choices for kids are going to be more conscientious this year — that with more parents able to make informed decisions about edutainment software, there will be a lot more in the stocking with some intrinsic value. She asked me to remind you about the Main-Street range, because apparently she hasn't had an order from you yet, but no doubt you have that under your belt.

PC User Magazine's chief sub editor David Flynn wants me to return his Ap8l* M%niou Pd@, along with a dose of spite from Spindler for blaming all we faithful scribes for the fact that it wasn't the answer to life, the universe and everything. He also wants you to take back the Super InfoThingy until we figure out what to do with it.

When I called Cath Hodgson from Clear Technology to ask if she had anything to bring over, she told me flatly that she wasn't so concerned with the duds you actually brought, but the stuff you promised that we never actually received.

So what do we want instead? Me, I want a remote control voice mail destruction device that will blast through the facade to the person

lurking on the other side waiting to find out whether you're actually worth talking to or not. Last time I wrote to you I asked for a Pinocchio-meter for marketing managers' noses, but *LAN Magazine's* Dan Tebbutt says you actually shipped the upgrade, which makes the product's new release buggy in proportion to the marketing department's hype, so I suppose I should say thank you?

David Henderson wants a jar of astral poly-filla to block up all the holes in the cellular and radio network, and Steve Townsend wants a mouse with tiny scrapers that clean the gunge off its internal rollers, and to find a hotel with a modem-friendly switchboard. He swears he has eaten his greens all year so at the very least I reckon you owe him that.

David Flynn also wants Don Lane: The Interactive CD-ROM, but I suspect you only need order one of those. Not content with that, he wants a year in which Bill will utter one complete sentence without using the word 'cool', and have several children called 1.0, 2.0, 3.0, well, you get the idea.

It would be a kind thought too, Santa, if you could drop a comb into Bill's stocking, even though we realise we'll have to wait until 1996 for him to start using it. Mr Flynn's list also includes a box of 3.5in disks which never runs out. And then he wants two more of those. I suspect he has been watching too much commercial television.

We know that you've announced you'll be shipping on 25th of this month, and we want you to know we'll be really disappointed if you let yourself be influenced by any trends you may have discerned south of the pole. At least we can count on simultaneous shipping, can't we? You've always been good at that in the past.

Finally, thanks for the great things you did bring us — notebooks that we can actually carry around, Internet addresses, the World Wide Web, wonderful CD-based software dream-worlds for our children (who am I kidding?), a government which finally understands the need to pay some attention to information technology and heaps more.

Have a great Christmas and travel safely — it's a highway out there!▲

Note: anyone who wants to add to our list of this year's duds can email Santa directly at Santa_Claus@ACP-Sydney.cmail.compuserve.com

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A PC for the home



BY MICHAEL MILLER

Ever since pundits first described the joys and wonders of interactive television, I've been saying "It isn't going to happen" loudly and repeatedly.

We've seen the market's lack of acceptance of several TV-orientated technologies, notably Philips' CD-I and 3DO. I won't call them out-and-out failures, but sales figures speak for themselves, and a resounding lack of titles is eloquent condemnation. Such machines simply cost too much and do too little for all but the most dedicated fans. At the same time, Nintendo and, most notably, Sega have gone ahead with dedicated game machines. Game decks are simple and cheap, which is more important to consumers than game quality. 3DO was a bet that consumers wanted better graphics and more sophisticated games. CD-I was much the same, but emphasised educational titles.

I'd like to see the industry make another bet, one that would marry PC technology with the TV. The compelling reason to do it is software. The huge library of software includes games and graphics titles that are suitable to television's softer, lower-resolution image. The big screen makes games more compelling too.

In previous columns, I put forth the theory that TV is passive and a PC active. In truth, that's oversimplifying. A computer and a TV are in different rooms for good reasons. First and foremost, TV steals time in half-hour seductions, while work (or play) done at a PC demands concentration and doesn't live by a program schedule.

As the games get more complex and the graphical content on the computer gets more TV-like, some degree of merger is inevitable. Nintendo and Sega are ample proof that people play games on their television sets, yet the PC has all the good software. Unlike cartridge-based games, PC software is open ended. For instance, id Software, the publisher of DOOM, makes a program that lets you create your own DOOM worlds and adversaries.

Many other graphically-oriented packages play well on TV. For instance, Knowledge Adventure's entire Knowledge Adventure Interactive Books series use big, bold graphics; large, readable type; and an oversize cursor. Even the somewhat delicate shadings of 3-D Body Adventure show up reasonably well on the big screen.

PC technology has driven the price of the components down to the point where a high-performance computer tailored to the TV-oriented consumer can live comfortably next to the TV set. Here's my proposal for a TV-oriented PC:

1. Make it look like a VCR. A power button,

a floppy disk slot, and a CD slot are all you'd see on the front panel. Keep the appearance consistent with consumer audio/video gear. Put the other stuff, such as a volume control and an input jack for a digital camera, behind a door. Oh, yes: no disk caddy. Use a drawer-type mechanism, as with audio CD players.

2. Pack it full of features. Give it a fast 486 or a slow Pentium, 8M RAM, 2M of video RAM, 500M of hard disk space, and Sound Blaster-compatible audio. Build in VGA-to-PAL.

3. Keep the back panel simple. Left and right-channel RCA jacks for audio, a video connector, and a parallel port will suffice.

4. Offer minimal options. An upgrade to 16M of RAM, an optional serial port/modem for networked or multiplayer games and a MIDI wavetable synthesis board should do the trick.

5. Make the keyboard wireless. Use a laptop-style keyboard with a built-in pointing device. It should be RF-wireless rather than infrared so the family dog doesn't get in the way.

The ultimate challenge is to get this down under \$1,000. That's not possible this year or next year, but it's achievable in 1996. Big hard disks today can cost as little as \$1 per megabyte, and that price will go lower. Even the PC's enormous library of available software won't get this machine hooked up to the TV unless it's very affordable. Price and the availability of inexpensive consumer titles are the gating factors.

The VCR-like PC, in turn, is the gating technology for the wide acceptance of other technologies. Chief among those is Photo CD. Kodak's groundbreaking technology is limited by several things: CD-ROM readers are not ubiquitous; computer screens tend to be small; and the home PC isn't located in places where you'd typically share family photographs. Using the family TV as a display device makes pictures a shared, fun activity, with none of the inconvenience of getting out the slide projector, setting up the screen, closing the blinds, and darkening the room.

Wider acceptance of Photo CD, in turn, presages the wider use of digital cameras, handheld or tabletop photo scanners, and inkjet printers for hard-copy output. These devices are available today, but they tend not to be consumer-friendly.

Movies are the one application I'm not looking forward to on the PC-VCR. I frankly think that the quality of films compressed to within an inch of their lives in order to cram them onto a CD is too low for all but the most uncritical viewer.▲

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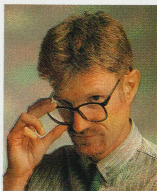
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Tuning in or out; the TV trap



BY JEREMY TORR

There is an old saying in the retail industries. It goes something like: "Bulldust baffles brains."

Now, while it might seem a gross generalisation to suggest that all computer equipment and service consumers have brains, it is equally erroneous to suggest that most computer companies are into the bulldust-spreading thing.

So why is it that virtually all the programs that seem to be springing up over our TV screens seem incapable of treating the audience with anything less than a thick and heavily cloying half-hour of bovine bottom produce?

You may think I am exaggerating, but these new wave, new age, new audience specials are so full of nonsense that most viewers who miss the titles are likely to think they have tuned into a cross between Play School and a techno-punk rage. They are, in the main, pointless, directionless and grossly uninformative.

If you are thinking of trying to find out more about computers, looking for information to help a buying choice or even interested in finding out about the Internet, look elsewhere. The most informative phrases may well be the like of: "... beyond the comprehension of mere mortals . . .", "... filled with miracles . . .", "... fan-tastic and extraordinary" (these are real quotes). We are talking about silicon wafers and CD-ROMs here, not a religious experience. So why the fervent language? Because the programmers don't know what the subject is all about.

Regular TV wisdom says you take a subject, give it a 10 second personality intro, let it run (with some snappy camera angles and a bit of electronic music thrown in) for three minutes, then move on to the next segment. Because the programmers don't understand computing, they don't see any reason to treat computers any differently. So the poor viewers have to sit through an amazing switchback ride of quick clips ranging from the patronising to the tripe.

Computers are described as being similar to Lego one minute, then given an acronymic overdose with BIOS, SCSI and multi-processors the next. Anything that is remotely ordinary and useful gets the elbow in favour of some weirdo plugging his chicken into a serial port, or the latest in games blood-letting from some banana-brain with a cranially implanted satellite dish. Likewise, because looking at system boxes is a bit dull, it seems to be obligatory to base these shows around studios that look as arty farty and

cool as the designers can make them. Somewhere between a junkyard and a Japanese living room is the usual result. Throw in a few anchorpersons who specialise in lengthy ear-furniture, references to the silicon revolution, data-super-highway and presto: the perfect computer TV show. Pig's arse. It is just hype dressed up as information; and even worse, it isn't even useful. It is bulldust looking for someone to baffle.

Certainly — and especially to readers of this publication — computers are interesting, but we really do have to ask if they are sufficiently interesting to make a good TV program about them. Scouring the planet in search of the latest whizzo application or amazing example of miniaturisation may be fun for the presenters, but the results are often scarcely useful to the viewer. Especially when only three minutes are allotted to that particular example of stunning technology. Which then drives a less than knowledgeable presenter to such feats of over simplification that the whole point of the exercise is lost.

Or is the motive behind this infestation of Bytes, Chips, Zones and so on more hard-nosed than the pure dissemination of information? Could it be that various marketing persons have been lured to the idea of a computer show by the promise of 'one in every home', and the fat advertising/sponsorship packages that might go with it? Could it be that the people who put the shows together in this obviously uncomfortable format do it that way because they have seen it work for animals, holidays, footy, cars and the arts? And why spoil a successful formula with actual relevance? Heaven forbid!

Perhaps it is time for the computer industry to grow up and realise it is just a product, not a religion. It is not worthy of a TV show any more than VCRs or washing machines would have been when they first became big sellers. Until those zany, zappy TV programmers get with the gist of it and realise most people buy computers to use, not to marvel at, the kind of pap we are being served is simply not relevant.

Just think for a minute: a show which included information about how real people use computers, or buying computers, or even how simple and useful computers can actually be — now that would be a show to watch. Until then, I reckon we are being asked to watch bit-based bulldust. And I for one think it stinks. ▲

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Readers' say

More Windows

In the current issue of *APC* there is an article regarding Windows95 and NT.

I would like to see an in-depth article on Windows NT 3.5 for both server and workstation versions. In this article it would good to see the advantages/disadvantages of NT over WfWG and also quantitative comparisons of NT 3.5 server against NetWare 3.1x and 4.0.

BTW great magazine. I like a magazine that doesn't treat me like an idiot, but if there are new words that have to be added to my vocabulary, it doesn't put me back into kindly class.

Gavin Adams
Newcastle
via Internet

Our feature calendar for 1995 will include full comparative reviews of the best personal and network operating environments — Ed.

Hard sell

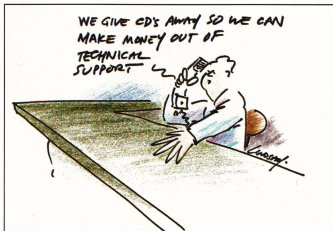
Would it be possible for large ads printed on cardboard to be placed together in one section of the magazine? It can be quite difficult to read issues such as November *APC* with the large Toshiba ad in the middle.

Andrew Foster

We're looking at how something can be done about this — Ed.

A little DOS will do it

In this month's *APC* the "Solutions: Technical Tips" section had a tip from a user who was delighted at having "discovered" the ability to have multiple sections in his CONFIG.SYS. Unfortunately, neither he nor the *APC* respondent pointed out to the general reader that this is a



feature of MS-DOS Version 6 and above.
David Holmes
via Internet

CD madness I

I eagerly installed the demo CD included with the November 94 issue of your magazine and even read the "read me" file before running the demonstration. As I have an Osborne 486DX2/66 fitted with a SoundBlaster 16 (a not uncommon setup I would think, especially as later on in the same edition you picked a SoundBlaster 16 package as Editor's choice), I expected some trouble running "Leonardo the Demo" but was rather surprised when my computer totally locked up, responding only to the power switch.

Using the tip in the "read me" file I was able to trick the demo into running, but nothing I could do would get the "Galaxy of Stars" to work past the introduction. I then contacted Roadshow New Media (wrong number in the boxed article, correct in the picture that was below) to be told I would have to ring a Sydney STD number to get technical support.

What sort of company is it that distributes advertising such as this and then asks you to pay to get it to work!

Nathaniel Tunbridge said in the feature article "The CD-ROM explosion is under way, and APC hopes to push it along a little..." I think you just helped it to the edge of the cliff with the distribution of this rubbish demo CD.

It does your magazine no credit at all to be involved with this. Did you check it first or was the lure of the advertising dollar the only consideration? Or perhaps this is another of your "contributions to the debate" like the Uniloc episode?

Trevor Tyson

CD madness II

I purchased the November issue of your magazine, the one with your "first CD-ROM cover disk" stuck on the front. I am writing to let you know that I can do without a disk such as this that:

- refuses to function,
- objects to anything else that is running and, one at a time, closes everything — including Program Manager,
- includes a demo of a

telephone book which displays nothing,

- scatters God-knows-what around my hard drive and adversely affects the way the computer behaves.

I can't believe that you stuck this disk on the front of your magazine without checking the way it behaves first. I would mention that I did consider buying the telephone book "demonstrated" and am now relieved that I did not.

I am now going to need an uninstall program to find what little this thing has spread around so that I can remove it.

Thanks for nothing.
Paul Thomas

CD madness III

Has anyone else reported problems with running "Leonardo" or "Galaxy of Stars"? (The Green Pages demo operates).

I installed the Video for Windows (though I don't know where it installs) then after it restarts Windows 3.1, and I start one of the above, the screen characters go black and white for a while, then into the introductions in colour. All the intro (until the male voice finishes) of Galaxy runs but then hangs when I try to go further. I get "General Protection Faults".

I'm using a newly purchased 486DX2/66 (8M) with a Trident 9400Cxi (1M) video card and a Sony double-speed CD. I've tried with 1024 by 768 and 640 by 480 by 256 colours with the same result. I've also used 1024 by 768 by 16 colours; it goes further into the intro, past the male voice and I get the female voice until I select one of the four options and try to play the selection. It then hangs with no

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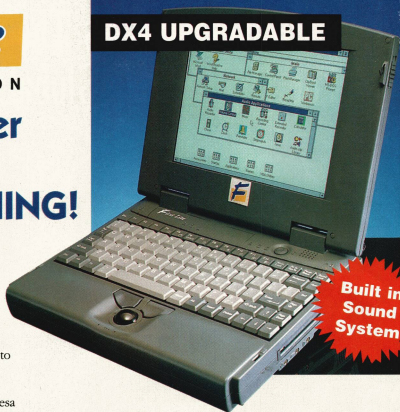
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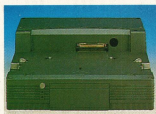


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error message — I have to use the three-finger solution.

Do you know the solution, please?

Peter Carson
via Internet

Cover disks are not a form of advertising. APC pays to put the disk on the cover, and the company involved produces the actual disks. We test any cover software on as wide a range of machines as possible, but, as with any software, there is always the potential for driver conflicts. A small number of readers have contacted us reporting problems. A video driver patch from your vendor will usually fix the problem. The CD should not have installed anything but driver software (Video for Windows and so on) on your hard drive.

I tend to reinstall Windows whenever there looks to be a serious conflict as a matter of habit these days. Problems with multimedia usually result from old driver versions or conflicts between different software packages that have been installed, rather than from bugs in the actual multimedia software. A clean Windows install usually works wonders.

We will continue to try to provide our readers with cover software that we think is interesting, that demonstrates a point or is of value to our readers. The risk of problems on some PCs is always there, but we'll try to keep it minimised — Ed.

Sticky problem

I frequently purchase APC. Recently you included a promotional disk attached with an adhesive to the front cover of the publication. The adhesive that you are using is very difficult to remove from the front cover without damaging it. Have you considered using a different method of applying the adhesive? Some British publications use a deep and narrow strip of a similar adhesive and this is quite easy to remove. Could you do something similar?

Philip Soderberg

We welcome comments

and suggestions. Send

correspondence to APC

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On a recent trip to North America, I came across an amusing paperback entitled the *Original Road Kill Cookbook*, by B.R. "Buck" Peterson. This astounding culinary guide, along with tips on how to take a chainsaw to a moose that you hadn't quite hit at the correct angle, tells how to prepare gastronomical masterpieces such as "pavement possum", "windshield wabbit" and "highway hash".

By the end of the trip I'd developed a deep empathy with many of the critters suggested as fender fodder, feeling much myself like roadkill on the information superhighway. I spent hours dreaming up recipes based on PCM-

CIA modem cards, UTP cables with lugs, and hardwired hotel phone handsets. At times, I was seriously tempted to try them out. It would have been an expensive broth, but deeply satisfying.

In theory, all the elements required for effective global pottering are in place and functioning, at least if you stick to modem,

industrialised countries. In practice, keeping in contact with base from overseas, and even within Australia, can leave you feeling like an I-way icky.

Pack up your troubles

There are many reasons for choosing a notebook over a desktop PC, irrespective of whether your work involves moving around frequently. Notebooks are still more expensive, less powerful, and less expandable than desktops, but the price of a reasonably configured machine is improving, as the reviews of units under \$3,500 in this issue demonstrate.

Generally \$3,000 to \$3,500 will purchase a reasonably configured monochrome unit with a reputable brand, while \$3,500 to \$4,000 should buy you a dual scan passive colour machine. At around \$1,250 to \$1,750 less than active matrix colour, dual scan passive is value for money.

The performance difference between a notebook and desktop is becoming less significant, with Toshiba's first Pentium notebook analysed in this issue and more on the way from NEC, IBM and TI. At the same time the new DX4-based NEC Versa M75, also reviewed in First Looks, scored a WinStone higher than some Pentium workstations we've seen, and in line with most DX4/100 workstations.

The new Versa M overcomes one of the remaining serious problems with notebook computing — the standard VGA size screen — by offering the option of 24-bit TrueColour or an 800 by 600 display internally.

Compact multimedia docking stations have been available for TI Travel-mates and IBM ThinkPads for the last few months, but even the requirement for a docking station is disappearing. The new multimedia Versa M has an onboard soundcard and reasonable speakers, while the new IBM ThinkPad 755CD includes a removable CD-ROM drive in the notebook's body — effectively in place of the floppy drive — a feat for which the ThinkPad was granted best new product award at COMDEX in November. The new Panasonic V41 and MPC Technologies MPC CD-Book 875 notebooks will join the ThinkPad too, and you can expect more vendors to follow their design lead.

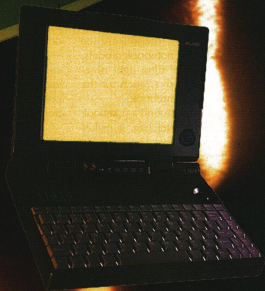
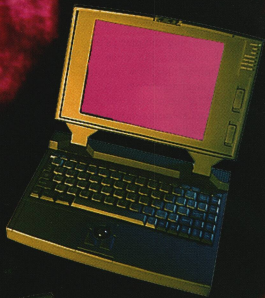
Admittedly these machines sport price tags as entertaining as their feature lists. Boosting a stock notebook configuration to 8M RAM, along with choosing dual scan passive colour over monochrome and a larger 200M plus hard drive will set you back less than a thousand dollars extra. That's still cheaper than buying a second PC because your notebook isn't good enough for full-time use.

I've been using an NEC Versa for the last year, but it is only one of a number of good notebooks around. Toshiba's T1910 is Australia's best selling

Mobile computing is improving, but the expense and complexity are still out of proportion to most other vistas of computing. APC analyses the tools you should take with you to avoid becoming info highway roadkill.

BY JEREMY WHITE

Grab and run



model, and won Editor's Choice in this month's roundup along with the slimline Versa, while IBM's ThinkPad holds the industry's unofficial title of "executives' choice."

PCMCIA is as plug and play as the Liberal party leadership, but once you've sorted out compatibility, two Type II slots complete the ideal notebook.

Most PCMCIA fax/modem cards work fine, but getting LAN adapters to work can be either impossible, or if you're lucky, frustratingly hard work.

On at least three occasions we've given up trying to get a name-brand NIC, such as a Xircom, to work with a name brand notebook, like the NEC Versa. Anyone who tells you "yes X will work with Y" is probably telling the truth, but ask them to show you the combination running before you hand over cash, preferably on your particular network.

Working extensively from battery power is unsatisfying. Battery life isn't long enough — and three or four or even six hours is not long enough. The Dell Latitude, with its claimed eight to 10 hours standard makes a pleasant exception, but there are few. Lithium ion technology promises an improvement, but it will take time. A second battery pack in place of a floppy drive is sometimes an option. Choose Nickel Metal Hydride over Nickel Cadmium; NiMH allows you to recharge on the fly, and generally has longer life, both per session and long term, whereas with NiCad if you don't fully discharge before recharging you suffer "battery memory".

Notebook weight is important when you carry a unit around with you everywhere, but I find the amount of junk crammed into your hand luggage usually weighs far more than the difference between any two stock notebook models. The exceptions are the ultra light notebooks and subnotebooks, such as the Compaq Aero or HP Omnibook.

While you can carry around a notebook in your briefcase or travel bag, it makes sense to buy a separate bag. The bags that ship with Compaq, Toshiba, NEC and others are good — durable, light weight and compact — but usually you'll want to be able to carry more than just the notebook and its accessories without taking a second bag.

My favourite is the Targus notebook backpack. The bag is well padded, waterproofed, sturdily constructed while light, and even has a "sweat plate" to stop moisture from your back.

A bag like this also has the advantage that it obscures the fact you're carrying several thousand dollars worth of equipment on your back.

I sometimes also use the MOHL — as my associates call it — the Mobile Office Home Laboratory, a sturdy 'New Yorker' travel bag small enough to classify as airline carry-on luggage with enough space in the clothes compartment to hold a standard notebook carry bag.

Cleaning your contacts

Keeping in contact with your office remotely should be simple. Within Australia it is. Overseas it's not. While the software is there, and 14.4K modem connections provide the bandwidth necessary for store and forward messaging, replicated groupware or basic LAN file access, the quality of international lines is inferior, with echo a major problem.

The degree of the problem varies greatly between countries and cities within countries, but even in North America it's hard to get a sustainable carrier back to Australia.

The other problem is the cost. Going through a hotel switchboard will typically cost \$1 or more for the call, even in many places for 1-800 numbers or their equivalent, and then 145% of the call cost or more.

An alternative is using a Telecom or Optus calling card, and if the overseas volume justifies it you can now also purchase Sprint and AT&T calling cards. Using these with a modem takes substantial experimentation to get the dial timing correct. For example, in some locations in the US it can take up to 10 seconds or more for the calling card's 1-800 access number to respond. Then you must enter your card number and pin, and then the actual phone number to dial. There is then a delay while the call is connected.

This isn't too hard to handle for a voice call, but getting it to work with a modem takes patience, especially if you're having problems establishing a sustainable carrier in any case.

I'd estimate that 75% of my attempted connections back to Australia on my most recent trip failed, and the bulk of those successful were at 2400bps. Considering that carrier time outs can take two minutes or more from call commencement, the cost of a failed attempt will be between \$1 and \$2, depending on time of day and the carrier chosen. The same failed attempt through a hotel switch on some occasions cost me more than \$7.

By the end of the trip, I'd resorted to attempting nothing more complex than hooking up with cc:Mail Mobile at 2400bps, which was not enjoyable either fiscally or emotionally.

Ideally, I'd have used Lotus Notes via a replicated service such as WorldCom, which allows you to replicate your home databases and mail via the services intermediary servers, which can be accessed both via TCP/IP across the Internet, or via a global X.25 network. AT&T Network Notes will provide similar functionality. You'll be able to dial a local number in the US to replicate your work indirectly with your home Notes server.

You can already achieve a similar process for Notes mail and cc:Mail over the CompuServe mail hub.

Using cc:Mail Remote or Mobile, or using a Notes client, you can dial into a local CompuServe number, and transfer email as though you were dialling into a Notes or cc:Mail post office. In effect, this is exactly what you are doing. If your home LAN-based mail system is also hooked up to the hub, your mail is forwarded to your hub persona, and vice versa.

Unfortunately, this involves setting up a different account to the home mail box. It also involves often complicated scripts.

The easiest, but most expensive way to access your email remotely is to dial directly back to your post office, because although this involves high connect charges and low line quality, your method of access is identical.

At the other end of the spectrum is pure online service access. You set your home post office to forward mail to a CompuServe ID, and then forget about your home system. This is dead easy, but especially if you're a Notes, BeyondMail or MS Mail user, CompuServe mail is pretty dumb, with vanilla text, no binary attachments (files get sent as binary items in separate messages), and limited mail handling or addressing tools.

Next time I go, however, I think I'll just forward my mail to a CompuServe ID. Local dial-up is available in most of the places you're likely to visit around the world, and there's minimal changing of scripts or access methodologies. What this system lacks in finesse or richness, it makes up for in that it works.

In this month's Networking section, Ben Gerholt analyses the broader topic of providing office access to remote users in 'Home and Away'. Solutions such as dial-in through a network modem, remote control software such as pcAnywhere (whether on a network or standalone), Windows NT Server RAS or NetWare Connect are feasible domestically, but not over serial lines internationally.

Ideally, you'd use TCP/IP and could get back to your home LAN over the Internet. This would be ideal, with low communica-



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tions costs and the same operational processes from anywhere in the world. The problem with this idea is that getting Internet access involves having an account locally, and these are remarkably difficult to organise on the fly.

Microsoft's new Microsoft Network, by virtue of the fact it will be well connected and bundled with Windows 95, will offer global mail and information exchange. Couple that with a universal inbox, and finally some operating system level support for mobile computing, and you potentially have a cure, at least for Windows users who don't mind being locked into Bill Brother.

More products are appearing geared to moving information around for mobile users, either between desktop and notebook or LAN and remote user. Windows 95 will provide Suitcases for mobile users, along with directory synchronisation tools, and other packages, such as the next release of Lotus Notes, will introduce short cuts for setting up subsets of networked information stores to take on the road.

Ideally, you wouldn't need to connect back to a home PC or office via a modem

and serial lines at all. This isn't as out of bounds as it sounds. As you'll see from the sidebar accompanying, feasible and relatively cost effective wireless communications are finally appearing for PCs.

Tippling and other social customs

When you go, wherever you go, you should take with you two small accessories — a Hack Pack and Rescue Kit.

Your Hack Pack contains the tools you need to get you connected to juice and communications no matter how technologically retrograded your in-transit abodes.

This should include at least a mini-screwdriver set (\$9.95 from any electronics shop), and RJ-11 to lugs phone cable. A plug adapter for the local outlet type is all that's needed for notebooks, as any worth buying will have an auto-switching power supply. If you use an external modem, you'll need an appropriate adapter for the country you're in. This is another advantage of a PCMCIA modem card.

It's unbelievable how many hotels lack standard RJ-11 jacks and have their phone handsets hard wired into the wall. Some-

times they'll have connector boxes that can be unclipped, but often the wires are completely beyond access. Whenever you come across anywhere like this, complain — it encourages change. It's a good idea to check before booking.

The Rescue Kit is the part most of us leave behind. It doesn't involve much — a boot disk with basic utilities, a card in your bag with home address and phone number, and a section in your autoexec.bat that displays the same. Notebooks have even less chance of being backed up than desktop PCs, at least those sitting on networks. Your Rescue Kit should at least contain a basic word processor and comms program in case you're completely wiped out on the road.

Working from anywhere anytime has a raw appeal. Setting up systems that allow you to do so effectively, whether you're an individual or tying back into a corporation's information systems, takes thought and planning. While the tools already here may be imperfect, you can establish workable solutions. But just in case, I'll be packing my *Roadkill Cookbook*. You never know what you might pick up on some dirt track back of the info superhighway. ▲

Wireless at last

The release of Motorola and Nokia portable PCMCIA wireless data transfer devices brings a new level of portable communications to notebook users. The networks used — Telecom's MobileData and Vodafone's digital GSM — offer vastly different services, however. To a certain degree, choose a wireless unit dependent on the suitability of the carrier rather than the device used to connect.

Motorola's one-piece Personal Messenger 1000 uses Telecom's MobileData. MobileData, launched in April this year, is a packet switch data network. Based on Motorola's DataTAC network it offers response times of 1 to 2 seconds per packet and will, in time, be linked to a worldwide network. Unlike voice network solutions, MobileData requires applications to be developed for it specifically. Remote users connect through the network to vendors' host systems.

Widespread acceptance of MobileData will come through third party service providers, such as Oz-Email, or by enterprises supporting remote employees by way of TCP/IP or X.25 links over the network.

Charges for the network are calculated on volume (per packet), making the service uneconomic for large file transfers, but ideal for messaging and routine services.



The Motorola Personal Messenger 1000 packet switch.

The most significant piece of MobileData user hardware is the Motorola Personal Messenger 1000, a Type II PCMCIA wireless packet switching modem. While Motorola has had a two piece packet switch solution for some time, the Personal Messenger released this month is the first device that integrates a packet switch radio transceiver onto a PCMCIA card. The unit is the size of an ordinary PCMCIA card with a 9V battery — required as sufficient power for transmission cannot be provided through the PCMCIA port — and an aerial.

The device was demonstrated to APC running with US-based Radiomail and Australian Oz-Email. As well as sending and receiving text based messages, we connected to Oz-Email using HyperBase and OzGopher in real-time. Performance was indistinguishable from a 14.4K modem connection, which is in line with the company's performance estimates.

The Personal Messenger has either an 8K or 64K buffer that permits its 512 byte packets to be received even while not connected to a PC. The card can use NiCad, Alkaline and Lithium batteries and will provide eight, 40 and 80 hours of continuous transmission respectively.

In contrast to Motorola, Nokia has moved to use the data capability of the GSM (Global System for Mobiles) network. Vodafone is currently working a step ahead of its digital network rivals — Telecom and Optus — with this service that allows its users to transfer data and faxes via its mobile digital network, as well as voice.

The new service allows mobile users equipped with a notebook to transfer data back to the office via a digital mobile phone rather than using a standard modem connected to an analogue telephone line.

Australian whitegoods manufacturer, Elite Limited Major Appliance Group, is trialling the new system in Sydney. The setup includes a Nokia 2110 mobile phone, PCMCIA data card and a GRID Convertible Pen Computer. This provides the user with a wireless link through the Vodafone digital network into the com-

pany's ATFM system software to the head office's AS/400. This real-time link offers a cost-effective and timely solution for the processing of orders and queries. Email limitedly to have all sales reps in the field on the Vodafone service by the end of 1997.

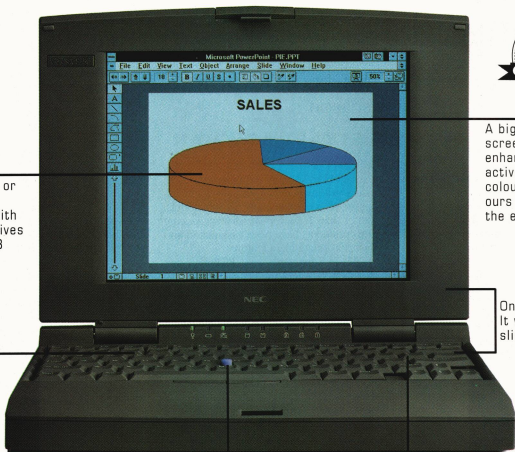
The GSM networks standard allows devices to use two methods for data transfer — transparent and non-transparent. Transparent transfer, sends data blindly and only relies on the applications' error correction capabilities. Non-transparent data transfer has error correction; corrupted data is recognised by the card which then requests the data be resent. Nokia claims to be the first company to have implemented this GSM standard and estimates the error rate for non-transparent transfer is 1 in 1 million bits compared to 1 in 1 thousand for transparent transfer.

Connecting directly from a PCMCIA slot to a Nokia 2110 digital phone, the Nokia Cellular Data Card appears to work identically to an ordinary modem. The GSM standard limits data transfer to 9600bps but permits the use of existing communications software and currently available services.

MobileData has many advantages over the GSM system including, claims Telecom, an error rate of 1 in 4 billion. Each device has an ID allowing packets from more than one host at a time. Also, as costs are per packet, users can remain online all day without incurring crippling charges. Don't expect to go bush with MobileData, however — in its infancy, the service will be restricted to major metropolitan centres. The Nokia system will offer wider coverage, however — at least initially — and will work with non-customised systems.

The Nokia PCMCIA Cellular Data Card retails for around \$900 — for more information contact Australasian Memory on (01) 299 5637. The Motorola Personal Messenger 1000 card costs \$1,299, contact Advanced Portable Technologies on (02) 906 3800 or Sourceware on (02) 427 7999 for details.

Maryanne Phillips and Ben Gerhart



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V E R S A . S L I M L I N E P O W E R

Stocking fillers: Notebooks under \$3,500

Christmas toys! Value-line notebooks for those on the move over the silly season

BY BEN GERHOLT AND STUART BOWMAN

Selling the car, kids and maybe even the house is no longer a prerequisite to becoming a road warrior with genuine credibility. APC has compiled a comparative review of notebooks for under \$3,500 that combine performance and features to keep voyeurs impressed at every fast food roadhouse between here and Perth. Imagine combining a bacon, eggs and toast breakfast at the Giant Merino with a quick call to pick up your e-mail, check the news and find the best motels in town. Bliss in anybody's books.

A big call...

APC asked notebook vendors to supply notebooks available under \$3,500. We also specified the notebooks have at least a 486 based processor, a 200M hard drive and 4M of RAM. We thought that these specifications would deliver machines capable of running Windows with reasonable performance and provide sufficient drive space to satisfy the average user. With installations of software suites taking more than 60M and Windows alone taking between 15 to 20M — Windows95 to probably take up to twice this amount — most notebook owners would have little trouble using a high proportion of the available space. While we think these specifications are the minimum users require, many companies contacted were unable to match them for the \$3,500 price tag.

We also asked those brand-name manufacturers unable to match the specifications to send in their entry-level units. This gave our reviewers the chance to see the features available in the brand name lines and compare the price and quality. These reviews are included but are not part of the main feature as the machines do not match our 'stocking filler' specifications.

...and those who answered.

Twelve vendors responded to our requests and submitted 14 notebooks that met the review criteria. Also, IBM, HP, Compaq, Acer and Zenith supplied their value line models for us to compare. NEC and

Toshiba both submitted dual scan passive matrix colour versions virtually identical, bar the screen, to their sub-\$3,500 models. Rather than have repeat reviews, pricing and comments have been assimilated into the appropriate main feature.

APC's Labs staff used PCbench 8.0, Winbench 4.0 and Winstone 1.0 to benchmark the notebooks. Benchmarking is done with both stripped and out of the box configurations. Only results for the out of box configuration have been listed. These benchmarking suites combine both system and real world tests. The processor intensive Rundown 2.0 that ships with PCbench is used with power management features disabled to test worst case battery performance. The results of all of these tests can be seen on page 86.

One of the most important features of a notebook is the screen. As expected, none of the units came with active matrix colour — expect to pay an extra \$2,000 for this feature/luxury over the mono price. Three of the machines included dual scan passive matrix colour. These dual scan screens don't match the brilliance of the active matrix variety but are still quite good. The remainder of the units had mono screens. The size of screens was also significant — all but one were 9.5in.

Additionally, while active matrix screens are by far the clearest, they use more power and cost significantly more than the dual scan or mono variety. The drop in prices can be seen in units like the Toshiba T1910CS with its dual scan passive matrix screen for \$3,884; the day of the entry level mono screen is rapidly drawing to an end.

With most notebooks using only low resolution displays and 16 to 256 colours, the demands on the graphics subsystem are minimal. However, when external monitors are used with resolutions higher than 800 by 600 or at colour depths greater than 256 colours, this shortcoming can start to drag the speed of your Windows back to that of an old snail. If you are serious about using an external display, ensure that the notebook uses local bus graphics and has at least 512K of video RAM.

Nickel metal hydride batteries supply the road power for most notebooks — the best in our tests, the Toshiba T1910, lasted

three hours and 52 minutes. Only two machines — the Archcom 486SLC33 and the Arrow Dual Scan — were supplied with nickel cadmium batteries and lasted one hour 19 minutes and one hour 27 minutes respectively.

Pointing devices ranged from trackpoints through ballpoints to less than acceptable original implementations. The trackpoint is becoming the pointing device of choice on many name brand machines, such as IBM, Toshiba, NEC and Acer. But non-brand name units are mainly large, staying with various ball implementations placed above and below the keyboard.

The processors used were generally Intel — SX/33 to DX2/66 — although Cyrix did put in an appearance. Not all manufacturers with Intel machines opted to use the low power SL Enhanced range CPUs. SL Enhanced processors maintain 486 performance while using Intel's system management mode (SMM) to integrate power management at a hardware level — transparent to the OS.

The Cyrix chip differs from the 32-bit Intel 486 in that while it operates internally at 32-bit, its external data path is only 16-bit. For example, the Archcom 486SLC33 that uses the Cyrix chip has processor test results which are significantly lower than the Intel processors.

Over the last 18 months the PCMCIA standard has developed from a "do I really need it?" accessory to a "must have". Notebooks that cannot use PCMCIA devices only really provide a fraction of the functionality and connectivity of modern notebooks. PCMCIA slots are the only option, short of a docking station, that can give your notebook the expansion capabilities approaching that of desktop machines. Better still, the devices are easily swapped without undoing case screws!

All of these devices offer advanced power management functions. These functions maximise battery life and, as a sideline, meet the green power saving standards. There are two types of hibernation modes available: One where information is copied to the hard drive and the other where it remains in memory and is powered by a second auxiliary battery.

When buying your notebook, consider the various options available. If you are going to be a serious road warrior, investigate purchasing a second battery and perhaps an external charger that can run off a car cigarette lighter. A different approach is taken by the Spectrum, which uses two batteries rather than one. This



This is an original analysis from a senior executive who trialed the new T4700CT.

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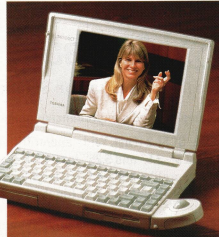
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allows you to hot swap one of the batteries without affecting notebook operation.

While external keyboards, mice and monitors can be connected directly to most notebooks, doing this on a regular basis is time consuming and tedious. Consider a docking station for your primary workplace — not only will it allow permanent connection to these peripheral devices but it can also offer extra drive bays and slots for network interface cards. Port replicators cost less money while still retaining a level of functionality.

Archcom 486DX2-66

Archcom supplied two units for our review. This model contained an Intel 486DX2/66 CPU (although you can opt for the less expensive 486SX or DX chips); 4M of RAM (expandable to 32M); and a 240M Conner hard drive (up to 340M available). No prize for guessing that this notebook is intended for the best-dressed end of town! It also has three key features of value to those using Windows on the run.

First is expandability. The front panel of the unit, directly beneath the keyboard, contains a slide-in battery pack of NiMH cells, and the adjacent floppy drive can be replaced with a second cell (\$148) to effectively double battery life to a claimed eight hours.

On the left side of the notebook's base is a slot which the manual intriguingly claims to be reserved for future expansion possibilities. . . The right side houses the PCMCIA dock, which accepts one Type III or two Type II devices. The rear panel has two drop-down covers which reveal the usual complement of external device connectors and I/O ports, along with a connector bay for the optional 5646 docking station.

The Archcom also offers an optional integrated sound system called AudioDrive, which was fitted to our test machine. Compatible with SoundBlaster and Microsoft's Windows Sound System, it

includes an 11-voice FM synth chip, digital playback and recording up to 22kHz and audio compression of up to 4:1, to squeeze WAV files to a sensible size.

The speaker is mounted on the bottom of the notebook, yet backfires clearly through the keyboard. Sockets for connecting a microphone, external speakers and a line input are sensibly mounted on the front panel directly beneath the trackball.

The bundled AudioDrive applications include an audio player/recorder, reminder, talking clock and calculator, as well as a selection of WAV files and a simple ProgMan-based browser utility. If you need to develop and make multimedia presentations using Windows, the combination of 486DX2/66 power, zippy graphics and inbuilt sound must put this one on your shopping list.

The Archcom has a pleasing overall performer. An inbuilt local bus video accelerator gives the graphics throughput a good dose of salts, as borne out by the Graphics WinMark test, in which the Archcom blitzed the field with a score of 10.3, almost twice that of the nearest rival (the Teco Chicony NB5) and left the rest of the bunch eating pixels. It also ranked a close fourth in DOS Video, with 3094.

Likewise, the Windows performance (a Winstone of 16.2 and Disk WinMark score of 412 were both well above average) and battery life (2 hours 44 mins in the all-guns-

ablazing rundown test, a full hour clear of the average and second only to Toshiba) were good.

The keyboard and large (25mm) Logitech trackball had a good feel, with the covers of the battery and floppy drive bays slightly raised to act as wrist-rests.

The Toshiba-sourced screen shows just how good dual-scan colour can be, with richness and depth of colour which makes you wonder why anyone would choose mono.

In summary: It sings like Streisand and soars like Superman — bump up the RAM, order a larger hard drive (you'll need both for those multimedia pitches) and hit the road!

David Flynn

Archcom 486DX2-66 Notebook

Distributor: Archcom

Phone: (02) 559 9288

Price: \$3,490

Specifications: Intel 486DX2 66MHz, 4M, 240M, 9.5in dual scan colour screen.

Archcom 486SLC33

Archcom's AC-3311 is an example of a notebook built down to a price — \$1,680 — which could please many buyers with 486 tastes and 386 budgets. That's a good estimation of the machine's performance positioning, too, as Archcom has chosen to base its unit on Cyrix's fastest (33MHz) 486SLC-class chip, which uses a hybrid 32-bit internal data path (albeit with a 1K 32-bit internal cache) and a 16-bit external data path. This makes it closer to a 386SX than 486 chip. The total weight of 2.9kg is tolerable.

Despite the fact that the AC-3311 comes bundled with Windows 3.11, this is not a Windows machine. The lack of any pointing device almost immediately rules this out of contention for serious Windows use.

Off-the-shelf RAM is set to 4M, which can only be expanded to 8M.

Cyrix's sorta-486 chip is underpowered

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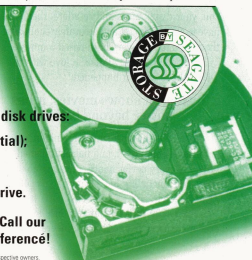
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Designed for maximum autonomy.

Using Philo, you can work with total independence for up to 9 hours between charges (Veritest benchmark), thanks to its sophisticated Extra Time energy management system.

Multimedia capacity.

Philo can carry up to 510 MB of hard disk and 32 MB of RAM. This capacity, together with MPC business audio and video local bus, allows you to organise colour animated presentations with voice and sound accompaniment. Philo is also an audio recorder and, thanks to its optional built-in fax/modem board, it can function as a telephone answering machine.

Available in a wide range.

The Philo range boasts 6 models offering a choice of screens and Intel CPUs, capped by the prestigious Philo 48 Colour Plus. All models feature a hiwayway PopUptrackball, on-line User Manual and preinstalled MSDOS, Microsoft Windows 3.1 and Lotus Organizer.

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For those who require an intelligent combination of performance, durability and aesthetics at the right price, Olivetti has created the Echos range. The three Echos models feature Intel 486™ processors and offer two Type II PCMCIA slots, built-in FDU and upgradeable modular architecture. Echos comes with video local bus on all models, and provides 6 hours (Veritest benchmark) of operative freedom.

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for most modern Windows applications. For command-line power — well, that's another story. If you find yourself in the position of needing to run heavy-duty DOS apps such as a database or corporate worksheet while on the road, then the AC-3311 might be your best bet for budget-minded grunt on the go. Not that the Archcom was outstanding in any of the DOS benchmarks, but what else can you get brand new for under \$1,700?

The AC-3311 offered a surprisingly large 340M Maxtor hard drive which received an average DOS disk score of 426 and equal last Windows disk score of 461. With a bearable 9in mono screen and lacking local bus graphics the Archcom performed poorly in the DOS and Windows graphics tests, with scores of 1402 and 1.9 respectively. It was par in most of APC's benchmark and real-world tests aside from the DOS processor score of 12.4. With low results across the board the Winstone score of 11.3 is hardly surprising. On the whole, though, the Archcom is well-entrenched in a comfort zone which neither threatens the opposition or lets you down. Expect no more than 2.5 hours from the NiCad battery — there are acceptable CPU and peripheral power-down options, but no standby hibernation mode. Recharging takes around five hours.

The AC-3311 also includes an in-car adaptor/charger and a large carry case. Bundled software included MS-DOS 6.2 and Windows for Workgroups 3.11, with a two-year warranty.

In summary: Got a lean budget? Got a load of straight DOS applications? Need a notebook to suit 'em both? The Archcom's AC-3311 is up to the task.

David Flynn

Archcom 486SLC33 Notebook

Distributor: Archcom

Phone: (02) 558-9288

Price: \$1,680

Specifications: Cyrix 486 SLC 33MHz, 4M, 340M, 9in LCD mono screen.



■ NEC Versa S/33

■ Toshiba T1910

Of the 14 machines that met our specifications, two offered an exceptional combination of features and performance.

While these two machines are not the performance leaders in the benchmark tests they did perform consistently well and with similar results. There are also many similar features on these two notebooks including 9.5in screens and Type III PCMCIA slots — features becoming de facto standards. Perhaps most interestingly, both featured hard drives from Toshiba!

From our point of view, the combined features, performance and quality of build left us with two machines that could not be separated on a value for money basis. Users will have to decide on more personal factors. You have to choose between

Toshiba's internal floppy drive or the lighter external drive equipped NEC or the pointing device you feel more comfortable with. Toshiba uses a quickport ballpoint and the NEC a keyboard mounted Surepoint pencil head eraser. Toshiba's battery rundown test result was also an incredible 3 hours 52 minutes while the NEC's was a respectable 2 hours 26 minutes. If you spend a lot of time on batteries this factor may weigh more heavily.

For a secure notebook investment in a machine with outstanding features and performance, one of either the NEC Versa S/33 the Toshiba T1910 should not be overlooked.

Arrow Dual Scan

AllData's Arrow offering for this comparison came with a 486DX2/66MHz processor, dual scan colour display, 4M of RAM, a 210M hard drive, single NiCad battery and a 9.5in colour display. It has a single Type II PCMCIA slot, a PS/2 port, serial port, parallel port, and video output. An expansion port for a docking station/port replicator is also present.

The 85-key keyboard has decent travel but lacks wrist support. Located in the top left corner of the clam-shell base, the trackball is less than ideal.

This machine was one of two which failed to complete the Winstone test at the WordPerfect section of the suite. The graphics subsystem can thank its high

Windows Graphics score of 4.0 to the local bus controller used in the system, unfortunately this did not translate into the DOS environment with a score of only 1795. The DOSMark and DOS Disk results of



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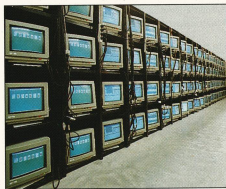
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368.2 and 335 proved to be very ordinary despite the Western Digital drive. Two of the better results were 981 for the Disk Winmark and a score of 34.7 for the Processor.

NiCad batteries are supplied and when you are using the machine the batteries take 15 hours to charge; two hours if the machine is switched off. The dual scan colour display from Sanyo will support 256 colours at 640 by 480.

Performance from the Arrow was good and at a competitive \$3,490, this 2.8kg colour unit packs a fair amount of punch. Only the trackball is disappointing.

Kenneth Loui

Arrow Dual Scan

Distributor: All Data

Phone: (03) 794 5799

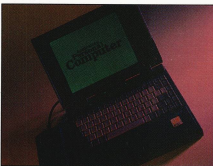
Price: \$3,490

Specifications: Intel 486DX2 66MHz; 4M, 210M, 9.5in DSTN passive matrix colour screen.

BytePro

The best word to describe the BytePro 486DX/66 notebook from Taiwan is "solid". It has tried to put in everything that everybody else offers — but it falls down on performance and a few design flaws.

For a machine with a processor running internally at 66MHz the BytePro returned an unimpressive processor score of 23.9 a score in the range of 30 to 35 is expected. Based around a local bus subsystem the



IBM ThinkPad 340

The IBM 340 ThinkPad is the only machine in this round-up that is built around IBM's own 50MHz, cached 486SLC2 chip. This low-power chip's charter fits well with IBM's aim to provide a low-cost ThinkPad that's solid and lightweight for the 'some-of-the-time' mobile PC user.

The \$2,690 ThinkPad 340 borrows from its big brothers' built-in feature set that has made the ThinkPad line a favourite — features including the distinctive black casing, TrackPoint II pointing device and use of a superb full-sized keyboard.

The unit's display is perhaps the best single example of this. Although the 340's 9.5in mono STN screen just doesn't reach the standards set by the higher-end 10.5in active-matrix ThinkPads, I find this 64 greyscale mono screen to be clear and easy to read from different angles. A nice touch is that this screen also lays back to the horizontal position, a feature introduced by the NEC Versa in 1992.

Performance-wise, the ThinkPad 340 won't blitz you. It was comparatively slower than many of the other notebooks tested for this review. Under PC Bench 8.0, the machine posted a DOSMark of 224.4, with its Processor and Video scores a little ahead of its Disk result. WinBench 4.0 and Winstone scores continued the trend, with the ThinkPad 340 notching a score of 2.8 for its Graphics WinMark, 213 for its Disk WinMark and 9.7 for Winstone. The 340 produced remarkably consistent figures across the spectrum of our tests, and although these figures are low in comparison to its top performing high-end ThinkPads, they are quite an achievement for a quality notebook available for under \$3000.

The machine we reviewed for this test comes in its base configuration with a 125M hard drive and 8M of RAM. A Type III PCMCIA slot is fitted at the back of the unit, plus there are built-in parallel, serial, mouse and video ports. With this model IBM has dropped the docking

DOSMark	224.4
Processor	16.5
Video	1622
Disk	260
Graphics WinMark	2.8
Graphics Disk	213
Winstone	9.7
Battery	1:27

port. The NiCad battery pack is easily removed, and if you want another to ensure extended use on the road, the company sells them for around \$300 each. The inclusion of the 1.44M floppy drive built into the front of the unit is a positive addition.

The warranty is 12 months, onsite. IBM also now offers free 12-month accidental loss and damage insurance with its ThinkPads.

This machine is from IBM's fourth round of ThinkPad releases. IBM takes the middle ground here, offering a safe bet that mimics as much as possible a fully-fledged ThinkPad. I like this low-end ThinkPad — it strikes the right mix to make the price right.

Maryanne Phillips

IBM ThinkPad 340

Distributor: IBM Direct

Phone: 13 24 26

Price: \$2,690

Specifications: IBM 486SLC2, 8M RAM, 125M hard drive, 9.5in mono STN screen.

DOS Video score of 3071 is more in line, the Windows graphics score of 3.5 was only average. Unfortunately the Maxtor drive let BytePro down with the third worst scores in the DOS disk harmonic (362) and Disk Winmark (266). The Winstone score of 14.6 was an improvement, but was only

slightly higher than the Toshiba T1910 notebook with a 33MHz SX processor.

Everything is upgradable, from screen to processor to hard drive. The machine comes with 4M of RAM and a 250M hard drive, these can both be boosted to 20M and 520M, respectively.

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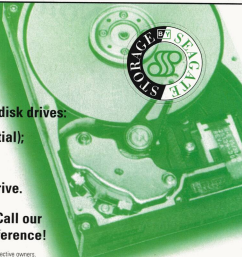
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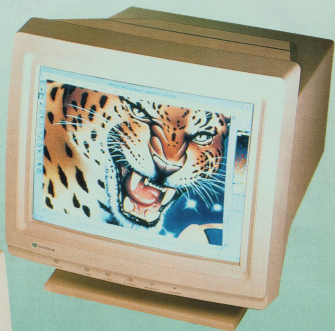
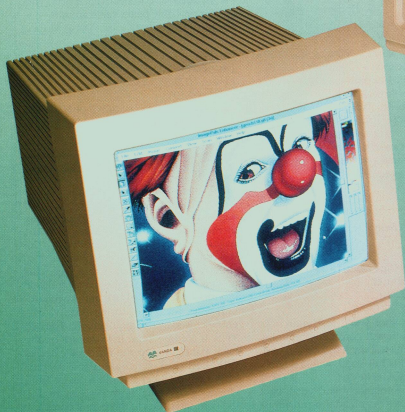
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OmniBook 530

Hewlett-Packard's sleek little OmniBook 530 packs such a punch in such a small space that it is hard to fault. It is so light it's not funny. A mere 1.36kg.

The OmniBook is a record-keeping and communications toolbox, crammed with the HP Appointment Book, Phone Book and Financial Calculator, as well as Lotus Organizer and the Microsoft Windows Works software suite that includes database, word processor and spreadsheet.

Measuring just 28cm by 16cm and 3.5cm thick, it could almost be described as a sub-sub-note! The external floppy drive is so light that leaving it behind is almost unnecessary.

Overall Windows performance for the light weight was exceptional. The Winstone score of 18.1 was outstanding for a subnote based on a 33MHz 486 chip which returned a processor score of 20.7. The DOSMark of 231.2 was below average and emphasises the optimisation of the subnote for Windows. The 130M hard drive was doubled spaced to 260M and returned the lowest DOS Disk result of 196.3 and similarly low Windows DiskMark of 173.

From its long-life batteries, which lasted almost four hours without power-saving, to its desktop-sized keyboard, this is a cool piece of computer art.

The mouse that pops out from the right-hand side is a strange-looking device. Like a fat designer clothes peg on the end of a thin, springy arm, the 'mouse' was difficult to get used to at first.

The reflective LCD screen is clear and displays 16 shades of grey. The screen seemed to have a brown tint rather than the rich grey present on other machines.

A DSTN colour OmniBook, to be known as the 600 series, was unavailable for these reviews but will ship in

DOSMark	231.2
Processor	20.7
Video	2107
Disk	196
Graphics WinMark	3.3
Graphics Disk	173
Winstone	18.1
Battery	2:31

December. The new subnote — with either 486DX2/50 or 486DX4/75 processors — will weigh only 1.72kg. HP will also enter the full-size notebook market in January 1995 when it ships the OmniBook 4000 Series that will include a top-of-the-line 100MHz 486DX4 with active matrix colour display and integrated trackball.

For handling words, figures and contact database, the OmniBook 530 is a workable light machine that can be plugged into an external monitor to display 256 colours.

For \$3,438 this machine is great value.

Thomas Liddle

OmniBook 530

Distributor: Hewlett-Packard

Phone: 131 347

Price: \$3438

Specifications: Intel 486SX 33MHz, 4M, 130M, 9.2in reflective mono LCD screen.

A major flaw is the half-depth PCMCIA slot, indented about 4cm into the machine. This does save on internal space but means that you would have to remove any cards every time you took the notebook on the road. The risk of damage, even when stationary, is too much of a gamble for most.

The re-badging of the large, curved BytePro logo sticks up from the palmrest,

smack in the spot you'll rest your right wrist. I found myself constantly bumping it and having to rest my hand on top of it. The keyboard is full-sized, with a slightly plastic feel to the keys.

Battery performance wasn't great. I got about 20 minutes out of it during an intrastate train journey. Re-charging it all night didn't help much, either. According to

BytePro the unit was pre-release, however. For better performance, overall, it is recommended that you ditch the NiCad and go straight for the more efficient and less problematic NiMH type batteries.

The passive Nimh monochrome screen is clear enough, but gives some cursor ghosting and turns into a blur when scrolling.

What looks just like a golf tee replaces the trackball or pointing device — a track pointer with a hat on. It is sunk into the wrist pad and is easy to use and sensitive to the touch. But give me a trackball any day.

The BytePro is heavy — 4kg with battery, and 5.2kg with the power pack. For \$3,395, the BytePro is competitively priced, but there is probably better value around.

Thomas Liddle

BytePro

Distributor: Byte Power

Phone: (07) 857 2388

Price: \$3,395

Specifications: Intel 486DX2 66MHz, 4M, 250M, 9.5in mono screen.

Laser LT433

The LT433 is a monochrome Intel 486DX class machine running at 33MHz equipped with a 260M hard disk and 8M of system memory, upgradable to 36M and a NiMH battery with a rated three-hour life. The 2.3kg weight is in the average range.

Some oddities stand out with this model. Firstly, there is the right-hand side mounted trackball above the keyboard. Left handers are immediately disenfranchised by this arrangement. The two Type II (or one Type III) slots are on the back panel next to the array of external CRT, keyboard, serial and parallel ports. This method keeps cabling away from cluttering up valuable workspace around the computer. Vtech, the parent company of Laser VTA, supplied their own BIOS. The CMOS setup was perhaps less full-featured.

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However, the most remarkable thing about both of these monitors is just how friendly they are.

The large lizard is said to give warning of the presence of crocodiles. While the WEN is also friendly in many other ways. It comes in a variety of

screen sizes from the 9" (226mm) mono to the 17" (432mm) top of the range model. There are also ten different versions to choose from. All with excellent colour resolution due to the small dot configuration.

Reliability is really where the WEN is on your side, with advanced componentry built into every model. All this, however, does come at a price and here again the WEN is very friendly. With prices ranging from \$200 to \$1,500.

For more information and your nearest WEN dealer phone DTK Computers on (03) 561 7022 or fax (03) 562 5211.

After all, it's good to have a friendly monitor around when you are up to your neck in crocodiles.

WEN 



tured than some competitors; notably in power management functionality. Expansion options are limited to dealer-installed proprietary memory modules and a proprietary internal modem that fits into a cavity on the left hand side.

Through all our benchmark tests the LT433 scored just below average. In a field that included clock doubled processors the fact that the DOSMark score of 326.6 and the Video score of 1540 are just below average is not surprising. The impressive result is the above average disk score of 472. Unfortunately this score did not carry through to the Windows Disk test with a score of only 317 Winmarks. The Winstone score of 23.6 was surpassed only by the Winbook which was outstanding in all respects.

The LT433 is an efficient machine that gets the job done with little fuss. True, the machine does have its limitations, but the feel of the keys is good, its performance is fair and it certainly costs a lot less than the similarly named product from Ford.

David Lin

Laser LT433

Distributor: Laser VTA.

Phone: (08) 232 4141

Price: \$2,500

Specifications: Intel 486DX 33MHz, 4M, 250M, 9.5in dual passive backlit mono screen.

Leo Designnote

The Leo Designnote, priced at \$2,995, represents value from Taiwan. It performed well in our tests, and has the bulk of features you'd expect from a high-end notebook.

Weighing 2.4kg, the Leo is lighter than competitive machines.

The 250M hard drive is removable and can be upgraded to 340, and the floppy drive can be pulled out and replaced with Ethernet, fax/modem, IBM 3270 emulator or SCSI I/O. PCMCIA slots also allow for more expansion opportunities.

Results for the Leo were slightly average. Its most outstanding score of 3171, second place, for DOS video can be attributed to the use of a local bus graphics subsystem. This

Compaq Contura Aero 4/33c

The Aero is a great subnotebook. It does have its faults but, as an overall package, this is a machine that I could work with on a daily basis.

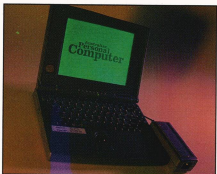
The system tested had a 250M hard drive and 8M of RAM. The 4/33c uses an Intel 33MHz CPU — the SL Enhanced 486SX. This combination ran well in benchmark testing and, of machines in this price range, the Aero is certainly an above average performer. With Winstone94, our real world application test, results were a particularly pleasing 18.6. Disk performance is good. The DOS disk harmonic was 555, well above average and the Disk WinMark mirrored these results at 404. Graphic test results were less impressive; the video harmonic of 587 was the lowest of both the brand names and units under \$3,500. The graphic WinMark results were similarly poor at 1.9 — not the worst but certainly below average.

Advanced power management settings can be switched through function keys combinations. Choose from standard configurations or customise your own through the easy to use Compaq BIOS. The unit features a hibernation mode, invoked by the main switch. The power itself is supplied by either a small AC adapter or a Duracell NiMH battery. On our battery rundown tests, the Duracell performed poorly — only half an hour.

While many subnote keyboards lack size and touch, the Aero's is comfortable to use and I found it preferable to the old Compaq LTE Lite keyboards. A palm rest hides the battery and also includes the integrated trackball to the right hand side — if you like using your left hand for trackball operation you're in trouble. Trackball select keys are located on the side of the case below keyboard level; functional but difficult to become accustomed to. Expansion is limited to additional RAM which can be added by removing a cover on the notebook's base.

performance did not translate to Windows, where it had a below average score of 3.3. Both the DOSMark and Winstone scores of 363.2 and 13.2 were in the middle of the pack and indicative of the DOS processor score: 25.6.

The full-sized keyboard is springy, and takes a bit of getting used to. And many of the keys double as other functions: brightness and contrast controls, for example.



DOSMark	259.2
Processor	19.7
Video	587
Disk	555
Graphics WinMark	1.9
Graphics Disk	404
Winstone	18.6
Battery	0:29

The unit has a single Type II PCMCIA slot, parallel and serial port but lacks external VGA and keyboard connectors. This can be overcome by attaching a port replicator or convenience base to the expansion port on the rear of the unit — at an additional cost of course. The 7.8in colour passive matrix display is crisp but, due to its size, an external monitor is warranted for extended work.

The Aero combines performance, quality and price. A larger screen and more battery life would be nice, but in the compromise that is part of any notebook purchase, the Aero comes up trumps.

Ben Gerbolt

Compaq Contura Aero 4/33c

Distributor: Compaq

Phone: (02) 911 1999

Price: \$3798

Specifications: Intel 486SX 25MHz, 8M, 250M, 7.8in passive matrix colour screen

The trackball is slick and the cursor size is adjustable for easy tracking. WordPerfect for Windows comes with the machine. Battery life was about two hours, and full recharging took four.

I was impressed with the low weight, the battery life and the look of the Leo. And at the price, you can't go wrong.

Tbomas Liddle

Leo Designnote

Distributor: Leo

Phone: (02) 748 4566

Price: \$2,995

Specifications: Intel 486DX2 50MHz, 4M, 250M, 9.5in mono screen.

Micro Book 9200m

The Micro Book 9200m is a classic no-frills notebook. With dimensions of 50 by 280 by 220mm and weight of 3kg, it offers few challenges or impediments to the basic ethos of notebook design.

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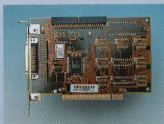
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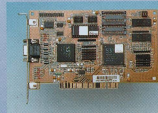
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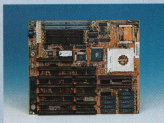
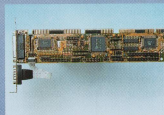
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MIO-V2

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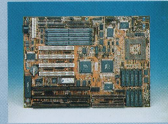


486-VIP-IO

Deep Green VL/ISA/PCI bus motherboard. Supports 486 & SL enhanced series, Cyrix M6/M7 and Pentium Overdrive (P24T) CPU. Offers four power management modes from Full-on to Suspend mode. Available bus are: two 32-bit VL-Bus, three 16-bit ISA and four PCI local bus. With enhanced IDE (M3/M4).

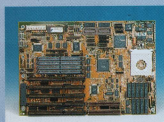
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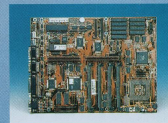
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Deep Green all-in-one motherboard with room for expansion. Support up to Intel DX4. S3 video on board for blazing graphics performance. Four level of power management from Full-on to Suspend mode. Built-in multi-I/O IDE and FDC interface.



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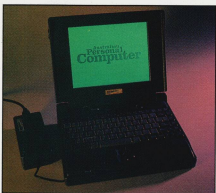
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For a small machine, the keyboard is exceptionally noisy, and placing the DEL key next to the left cursor can lead to some annoying deletions.

With the recent move by many vendors to dump monochrome screens from their ranges, the Micro Book seems something of an anachronism.

Based around a DX2-66 CPU and local graphics, better performance from the Micro Book was expected. The processor score of 31.5 was less than other DX2-66



machines, which, in general, scored above 34. The DOSMark of 367.4 was par for the course but the Conner drive and disk sub-system gave the lowest DOS Disk score of 321. Windows disk performance was a radical departure from this poor result: second place with a score of 878 Winmarks. Graphics benchmark results were also high at 4.6 but the 9.4 Winstone result was the lowest of the test group.

Despite its monochrome screen, the 9200 offers limited multimedia support in the form of a speaker and microphone, supported with the standard Windows audio accessories. The system sound was not outstanding, but adequate. Volume (and other system functions) are controlled with the Fn keys in combination with various other keys.

The floppy drive is located on the right of the unit, with sound jacks for external connections immediately below it. Status indicator lights are quite small for a notebook unit, but fairly clear. The machine has two separate battery ports for its nickel metal hydride batteries, each of which pop out from the front of the keyboard. At \$3,500, it seems a reliable, conventional performer — but one which is a little expensive for the facilities it offers.

Angus Kidman

Micro Book 9200m

Distributor: Micro Pro Computers

Phone: (02) 907 1222

Price: \$3500

Specifications: Intel 486DX2 66MHz, 4M, 200M, 9.5in LCD mono screen.

Compaq Contura 400

Resembling a large vinyl photo album, the \$3511 Compaq Contura is not an attractive machine.

This notebook caused more problems than any other machine tested. The original unit sent to us failed during benchmarking. Compaq supplied us with a second machine which managed to complete the benchmarking tests but wouldn't boot for this reviewer. Third time lucky was probably the thought uppermost in mind at Compaq HQ when they sent another machine, virtually identical to the benchmarked unit with the addition of an active matrix rather than dual scan mono display.

The second of the three, the machine that was actually benchmarked, featured 4M of RAM, a hard drive with 170M of drive space and a 9.5in STN passive mono display.

The machine's performance matched its looks: average. The 486DX2/40 based machine's only claim-to-fame was a 703.3 DOS disk harmonic score. The remaining results were uneventful or, as was the case with the Winstone (11.6), almost disappointing.

The Contura has a palmrest in front of a near full-size keyboard. This keyboard includes a full dozen function keys as well as dedicated keys for page and cursor control. A medium sized trackball is located in the middle of the palmrest.

The power pack is larger than the Aero's, but not by much — it's about the size of a clenched fist. Battery power is supplied by a NiMH Duracell which returned a rundown result of 3 hours 11 minutes — an excellent result. The battery lives underneath the keyboard and palmrest in a caddy that drops down for access.

PCMCIA is offered in the form of two Type II or one Type III slots. These have a spring loaded access cover that

DOSMark	343.9
Processor	21.9
Video	1472
Disk	703
Graphics WinMark	2.9
Graphics Disk	223
Winstone	11.6
Battery	3:11

folds into the machine when the slots are in use. Unique lever-like devices are present for PCMCIA card removal.

A PS/2 mouse or keyboard port is included as is a VGA port. An expansion bus on the rear of the Contura enables a docking station or port replicator to be connected.

The overall view: an inexpensive machine that offers average performance but great battery life, and certainly has room for improvement.

Ben Gerbolt

Compaq Contura 400

Distributor: Compaq

Phone: (02) 911 199

Price: \$3,511

Specifications: Intel 486DX2 40MHz, 4M, 170M, 9.5in STN passive mono screen

NEC Versa S/33

NEC's reputation is set to continue with the Versa Slimline series, boasting three models — a mono, dual scan STN colour and full active matrix TFT colour.

Traditionally the subnotebook market has involved a compromise of features. The bald specifications read just as you'd expect; a 9.5in screen display, hard disk capacity of 210M for the mono or a choice of 210M or 260M for the colour models. NEC's penchant for offering a variety of CPUs has been carried over from earlier models. The 33MHz SL-enhanced 486SX CPU is bumped up to a 50MHz DX2 in the TFT model.

The keyboard is big. There is a nice wide palm rest and the pointing device is the same as the one which made the IBM Thinkpad famous. The STN colour model we looked at was pleasant to use but the keyboard had a 'give' to it that was a bit disconcerting.

Where the Versa cuts down in weight to under 2kg is through eliminating the internal floppy disk drive. Users will not have to shell out for the drive as an option

as there is a dedicated port on the back for an external floppy. Also, the popular full notebook expansion option of two PCMCIA Type II slots is employed.

The smart features in the BIOS extend to a comprehensive set of power management controls. Our battery rundown tests rated both Versa Slimlines above average when stripped of their power management. The mono model shaved the STN colour as would be expected. NEC rates an average of between two to four hours battery life in real-life working situations.

The mono Slimline just about flew for a 486SX/33 class machine in DOS benchmarks, with a DOSMark score of



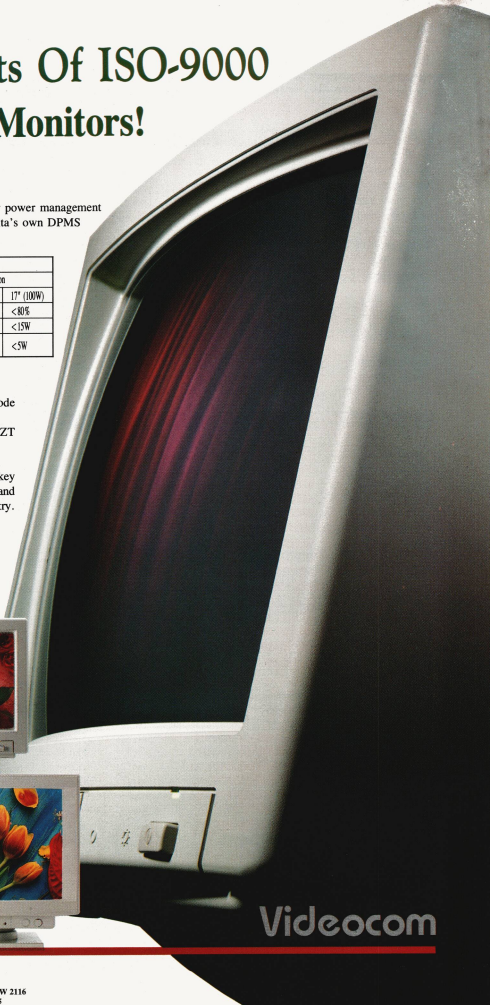
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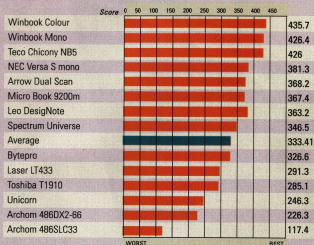
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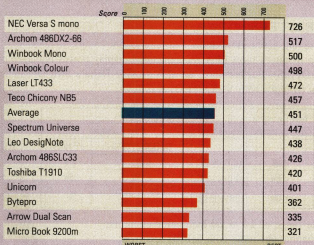
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Benchmark tests: Mobile computing

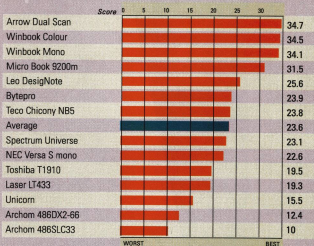
DOSMark



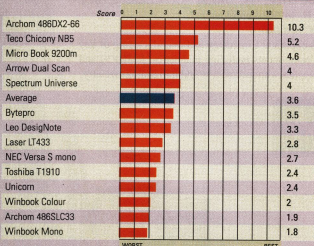
Disk



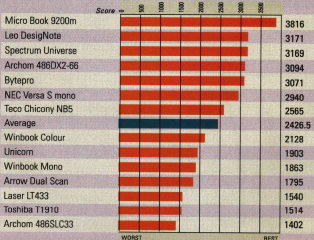
Processor



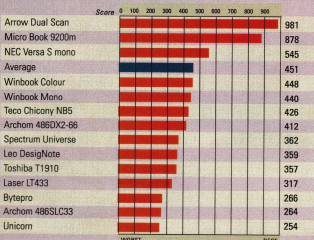
Graphics WinMark



Video



Disk WinMark



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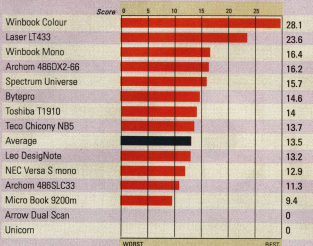
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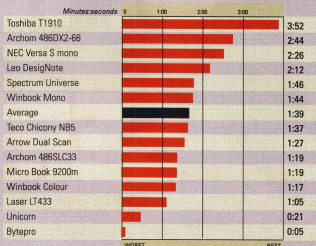
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Benchmark tests: Mobile computing

Winstone



Battery Run-down



381.3. Using a Toshiba drive the NEC mono returned the highest disk score overall, 726. In Windows, the performance of the disk subsystem dropped slightly with a score of 545. The Windows Winstone score of 12.9 was 4% below the average — this is in line with the processor score of 22.6 which was also 4% below the average.

The software bundled with the Versa Slimlines is all that you need to get started. MS-DOS and Windows 3.1 are there. The PCMCIA support is through the excellent CardSoft drivers with some handy NEC-supplied utilities included.

David Lin

NEC Versa S/33

Distributor: NEC

Phone: (02) 930 2000

Price: From \$2,491

Specifications: Intel 486SX SL, 33MHz, 4M, 210 to 260M, 9.5in mono/dual scan/active matrix

Spectrum Universe

The \$2,900 Spectrum Universe 486DX2/66 is a smooth, stylishly designed notebook that offers surprising flexibility. The machine sports a modular design with a removable hard drive, two PCMCIA slots (one Type II and one Type III), easy expansion of RAM, and two removable batteries. A 128K secondary cache is included in addition to the standard 4M of RAM.

This machine weighs in at a relatively chunky 3kg but is solidly constructed.

The keyboard is well placed towards the back of the machine allowing the front of the notebook to be used as a palm-rest.

Zenith Z-Lite Colour

Zenith's new subnote offering in the Z-Lite range has many excellent features and weighs only 1.9kg.

Performance from the Cyrix 486-33 processor based machine was below average on nearly all tests and the machine gave a particularly disappointing Winstone result of 6.2. This is not surprising as the processor returned a result of only 10.4 which is in line with the Cyrix based Archom 486SLC33. If you intend to use an external display be prepared to wait a while — the Windows Graphics score of 1.7 was second lowest overall. Performance in the Windows Disk tests was somewhat more respectable with a score of 440.3 Winmarks.

The keys are tightly packed and lack travel. New users will need to spend time becoming accustomed to the size of the keys but Zenith has made this task a little easier by sloping the keyboard down to the front.

The Z-Lite comes with Zenith's J-mouse pointing device which is integrated into the J key. Holding the key down for a period allows the cursor to be moved.

Zenith has also produced a trackball pointing device — known as the LitePoint — that attaches to the front of the notebook by two thumb screws and two 3.5 mm audio-like sockets. The LitePoint also doubles as an effective wrist pad.

One of this machine's strongest features is its provision of two Type II PCMCIA slots rather than just a single slot as found on most subnotes.

The 7.8in single scan passive colour screen provided with the test unit was clear.

The unit is rounded off by a floppy drive that connects through the parallel port, a small power pack and an LCD status panel that displays most settings including battery life.

The NiMH battery supplied lasted 2 hours and 32

DOSMark	167.1
Processor	10.4
Video	1563
Disk	263
Graphics WinMark	1.7
Graphics Disk	440
Winstone	6.2
Battery	2:32

minutes in our run-down tests — a great result. The power management has a setup separate from the BIOS and can be accessed at any time — not just on boot. Full management functions are provided as is a user configurable hibernation mode.

The Z-Lite is an interesting unit that has features few subnotes can match. Unfortunately the unit's performance is poor. Carefully weigh up speed versus functionality settling on the Z-Lite. Zenith also sells a monochrome Z-Lite that has an Intel 486SL35 processor and 170M hard for under \$2895.

Ben Gerbolt

Zenith Z-Lite Colour

Distributor: Z-Express

Phone: (02) 417 1522

Price: \$4,468

Specifications: Cyrix 486 33MHz, 4M, 200M, 7.8in single scan passive colour screen

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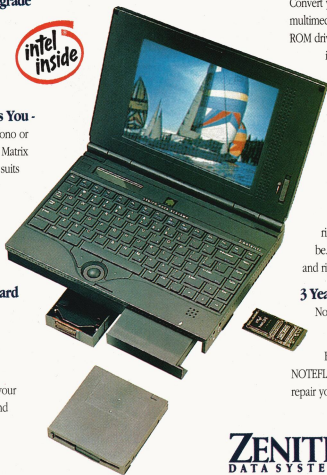


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The trackball, integrated into the palmrest is precise — a step above the keyboard in quality.

This machine performed consistently. The DOS Video score, using local bus graphics, of 3169 was a creditable third and the Graphics Winmark (4.0) placed it equal fourth. A score of 15.7 in the Winstone results, together with relatively similar performance in the DOS Disk and DOSMark combined score shows the system's solid performance. Using an IBM drive and local bus disk access the Spectrum scored an and very ordinary Disk WinMark of 362.

The batteries are Nickel Metal Hydride and on our rundown tests lasted 1 hour and 46 minutes.

The LCD screen is capable of 64 shades of grey, at a resolution of 640 by 480 but the actual picture quality of the display is poor. However, when connected to a monitor, the video system manages to pump out 256 colours at 1024 by 768.

Extra NiMH batteries can be purchased at a cost of \$205 per pair and a docking station will set you back \$860. Alternatively purchase the port replicator for \$200.

The Spectrum provides solid overall performance at a reasonable price and includes a three year warranty. Although the display is disappointing the system has much to offer.

Kenneth Loui

Spectrum Universe

Distributor: Spectrum Cellular

Phone: 1800 818 687

Price: \$3,290

Specifications: Intel 486DX2 66MHz, 4M, 250M, 9.5in mono screen.

Teco Chicony NB5

For a 486DX2/66 based notebook, the \$3,350 Teco Chicony NB5, with its 9.5in mono screen, 250M hard drive and inbuilt audio packs a few surprises.

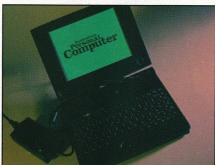
The base system shipped with a 486DX2 processor running at 66MHz, 4M of RAM and a 250M hard drive. With this configuration it scored a DOSMark of 426,

which placed it a close third to both the Winbook colour and mono units. Considering its relatively low processor score — for a DX2/66 CPU — of 23.8, and average disk harmonic of 457, this is an excellent result.

Windows results varied considerably. Its 512K of video RAM and local bus graphics enabled the unit to gain second place in the Windows Graphics tests with a score of 5.2 million Winmarks. Both the Windows Disk scores and Winstone scores, 426 and 13.7 respectively, were slightly above average. The mono STN display from Sanyo is acceptable for basic Windows operation.

When running the processor intensive battery rundown tests the 1.8 Ah NiMH battery lasted for 1 hour and 37 minutes. Additional time can be achieved by removing the floppy drive and inserting a second battery (\$177) and by enabling the power management features from the BIOS start-up menu.

If you are after extra features then the Teco may be the unit for you. From the two Type II (one Type III) PCMCIA slots to the wrist pad mounted trackball and inbuilt audio the Teco has more extras than most.



The inbuilt audio is Windows Sound System compatible with optional SoundBlaster and AdLib compatibility. If you are serious about your sound then take advantage of the microphone and speaker jacks rather than using the microphone and speaker mounted at the base of the screen.

A PS/2 port is provided allowing an external keyboard to be connected. If this isn't enough expansion then you have the option of purchasing an external docking station for \$895.

If you are in the market for a mono notebook with business audio capabilities then the 2.6kg Teco Chicony NB5 would have to be a contender.

Stuart Bowman

Teco Chicony NB5

Distributor: Teco

Phone: (02) 725 1233

Price: \$3,350

Specifications: Intel 486DX2 66MHz, 4M, 250M, 9.5in mono STN screen.

Toshiba T1910

Every now and then you stray across a laptop that has everything — including a \$10,000 price tag. Sometimes you come across similarly equipped units for a lot less. The Toshiba T1910 range of Value PCs fit into the latter category. The T1910/120 (120M model) is listed at \$2,775. Aimed at the SOHO and education market the T1910 series, according to the IDC Micro Store-Board report, has been the top selling PC (desktop units and portables inclusive) for the second quarter of this year.

We received two evaluation units from Toshiba. The T1910 has a 486SX SL enhanced 33MHz processor, 4M of RAM, 200M hard drive, sidelit mono LCD panel and impressive pricepoint of \$3270. The second unit is similarly equipped with a dual scan STN colour LCD panel in preference to the mono display. Unfortunately its pricepoint of \$3885 placed it beyond the \$3500 cut off point.

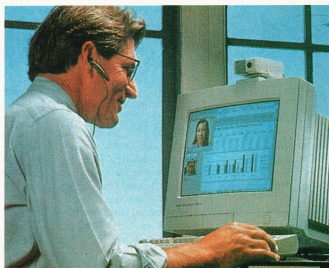
While they wouldn't set the world on fire, the DOS benchmark scores for the T1910 were respectable and except for the video score of 1514, held an average position. The DOSMark score of 285 placed it just below the average for raw DOS based performance. By making use of an efficient memory subsystem and software disk caching the DOS disk scores were nearly doubled, with a final result of 420, when Smartdrive was enabled. An increase in the range of 25 to 35% was experienced by the majority of machines in this round up.

Lacking a local bus graphics accelerator and equipped with only 256K of video RAM, the Graphics Winmark of 2.4 placed the unit in the lower third of the group. Under Windows the disk performance suffered with a Winmark score of 357 which was also just below the recorded average. When running the application orientated Winstone tests the overall positioning of the T1910 improved with an above average score of 14.0.

The 9.5in mono sidelit screen is viewable from most angles and provides for adequate definition between grey shades. When using an external display the laptop is capable of driving a VGA display output at 640 by 480 with 16 colours.



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With a battery rundown score of 3 hours 52 minutes, the on road capabilities of the T1910 are definitely one of its strongest points. With power management features enabled the unit should last for up to five hours. Unlike many laptops the T1910 uses three internal batteries. The third battery is used to power the RAM when the system is placed into suspend. Unlike many of the power brick AC adaptors used, the thin-line power supply is relatively small and can charge the 2.6 Ah NiMH battery in 2 hours and 20 minutes.

With one Type III PCMCIA slot, a Quickport mouse, two PS/2 adaptors and obligatory serial, bi-directional parallel and VGA ports the unit has all the expansion required short of a port replicator or docking station. Although the Ballpoint Mouse is a separate attachment it is significantly more functional and comfortable than many of the built-in mouse units featured in this round up.

What these reviews have made obvious is that buyers should be more concerned with quality rather than raw speed. In this respect, the T1910 series is an ideal compromise between performance and price. If you can spare the extra bucks, make a move for the dual scan colour T1910CS model.

Stuart Bowman

Toshiba T1910

Distributor: Toshiba

Phone: (02) 887 3322

Price: Mono: \$3,270;

Specifications: Intel 486SX SL Enhanced 33MHz, 4M, 200M, 9.5in sidelite mono LCD screen.

Colour: \$3,884

Specifications: Intel 486SX SL Enhanced 33MHz, 4M, 200M, 9.5in dynamic STN dual scan colour LCD screen.

Unicom

In several significant ways the Unicom is, like its namesake, an animal from a past era. It's bulky. The over-all form factor and 4kg travelling weight (including adaptor) are not the stuff of the sensitive new-age notebook.

The model supplied for our review bore a mono 9.5in Sharp-sourced screen which lacked definition, with the right side of the display as faded as your old Levis. The range of viewing from all angles was acceptable, but only if you consider a mono screen acceptable in the first instance. I did in 1992 and perhaps 1993, but not today...

The Unicom is powered by Intel's 486DX2/66 chip and stacks the apps onto a 250M hard drive. Another concession to 1994 is the appearance of the PCMCIA port, which can accommodate one Type III or two Type II devices.



An 8550 docking station adds two 32-bit VESA and four 16-bit ISA slots, two drive bays, SCSI port, serial and parallel ports, plus two speakers and a power supply.

The keyboard sports a fairly standard layout and is easy to become comfortable with, more so because all the keys are quite large and have the short travel which many power typists prefer.

Our test unit had 4M RAM installed, with users being able to chip-up to their whim to a total of 20M. The 128k cache and 512k video RAM should have helped it make a better fist of our many tests, but not so. Performance was what you'd expect from a budget-priced clone. Never top of the class and never durable, with the exception of a failure to complete the real-world application test suite of Winstone. The best gauge of overall performance can be gained from the DOSMark score of 426.0, which was third lowest.

Quoted life for the NiMH battery is 2.5 hours with a 2 hour charge-up. Our battery run-down tests showed the Unicom performed poorly compared to established names such as Toshiba, Compaq, H-P and NEC.

In summary: the Unicom is an adequate machine in most respects, good on paper for the price, but performance is nothing to write home about. It's a blast from the past, sans blast.

David Flynn

Unicom

Distributor: Unicom Computers

Phone: 1800 810 400

Price: \$2,895

Specifications: Intel 486DX2 66MHz, 4M, 250M, 9.5in mono passive screen.

Winbook Colour and Mono

Calling your notebook offering the Winbook, with the implication that its performance in the Windows environment will match some tough expectations, could be asking for trouble. However, the Microscience Winbook — reviewed here in its DSTN colour and monochrome incarnations — rises to the challenge.

Both the monochrome and colour models offer an easy to view screen, and for relatively graphics-unintensive applications, such as word processing, the mono screen would be quite adequate.

The DX2/66 processor enabled the Winbook to take out poll position in the DOSMark test with scores of 435.7 and 426.4 for the colour and mono models respectively. The video system performed poorly with DOS results of 2128 and 1863 (colour and mono). The Graphic Winmark mirrored these poor results with a score of 1.8 for the mono and 2 for the colour. Surprisingly the Colour notebook blitzed the Winstone tests with a top score of 28.1, and the mono version came in at third place with a score of 16.4.

Keyboard response from the Winbook was also pleasing. While a notebook keyboard which can match the full version seems unlikely in the immediate future, the Winbook approaches the ideal, with its solidly responsive keyboard and straightforward layout. The central trackball is also well-designed and implemented, striking a good balance between precision and speed.

A suspend button on the main chassis shuts down the machine to maximise battery life. Unsurprisingly, battery performance on the mono model is slightly better than the colour version, although neither proved outstanding. Mobile users will be pleased to note that a car adaptor unit is available for \$45.

At \$3,500 for the colour version, the Winbook offers everything you'd expect from a notebook in this class at a sensible



price point. The monochrome machine is also a strong contender, but the extra \$800 investment for colour and stronger Windows performance is well worth it.

Angus Kidman

Winbook Colour and Mono

Distributor: Microscience Computers

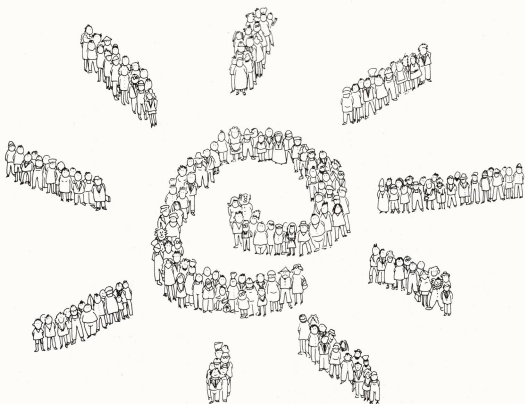
Phone: (03) 699 8877

Colour: \$3,495

Specifications: Intel 486DX2 66MHz, 4M, 210M, 9.5in DSTN colour screen.

Mono: \$2,795

Specifications: Intel 486DX2 66MHz, 4M, 210M, 9.5in mono screen.▲



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CONSUMER PASSION:

Janis Joplin's raucous refrain of the icons of consumerist society in the late 1960s never included a PC. She wanted a Mercedes Benz, a colour TV, both of which were beyond her reach but not her understanding. Symbols of status and comfort, of a better lifestyle.

But if she had been transported to the early 1990s, would the song have been any different? Would she croon that she craved a multimedia PC with a double-spin drive, at least half a gig of space and 8M RAM? Probably not.

Because these words belong in the lexicon of the computer savvy, the enthusiast, and consumer computing is about very little of that.

When we think of consumer goods, we think primarily of appliances that belong in the kitchen or the lounge room, which require little more than being taken out of the box, plugged in, maybe a cursory glance at the instruction leaflet, and presto!, it works. PCs have not been generally regarded in this way. Before the current wave of plug in and turn on PCs, computers were perceived as something that you needed to know about, in an in-depth way, before you could buy one, and the effort to get that knowledge didn't equate to the benefit that could be gained by using one.

It was not until the advent of PCs out of the box, such as the Compaq Presario and the

A PC with the lot

**"Oh lord, won't you buy
me a Mercedes Benz**

**My friends all drive
Porsches, I must make
amends**

**Worked hard all my life
time, no help from my
friends**

**So lord, won't you buy
me a Mercedes Benz"**

newly released IBM Aptiva, that PCs finally became a consumer item, a requisite addition to the home, whether in the study, the family room or the kids' bedroom.

By differentiating the home PC from the work PC then, in key areas, notably the lack of complicated cable and set up procedures, the computer industry has wooed consumers in a wave which has taken even the most enthusiastic by surprise.

Hardware driven

The phenomenon is fundamentally hardware driven, says Inge Fugelstved, national marketing manager for Compaq Australia, although there has been a convergence, almost collision of computing elements to create the ideal climate for this expansion.

"If I am honest I have to say I really do think it is hardware driven, because education software has been around for quite some time without making a significant impact. The average PCs, which were designed as business tools, were strictly the province of the enthusiast, who knew all the bits and pieces. The average person was put off by the thought of what they were going to need to know. So the important factor here is the design of PCs specifically for those people in those home scenarios, rather than the expectation that these people would buy a business tool and make it fit."

Price, too, is an important criterion, but again Ms Fugelstved maintains that it's not just the price of the PC, but the price of the comfortable choice, which has made the difference. "We have had the situation for some time that we could buy a PC for \$2,000, but those ones have commonly been the ones nobody has heard of. Now, when you're buying something unfamiliar, whether it's a television, a washing machine or a PC, you're naturally going to look for something that at least bears a name you know, or that has a reputation, or at the very least a track record behind it. So it's the price reduction in brand name computers which I think is more significant than price itself."

Thirdly, there is the wider availability and cost reduction of CD-ROM drives. In the area of CD-ROMs, the pundits of two years ago could hardly have been more off target,

claiming that it would remain the province of the boffin. "In our business range, the take up of CD-ROM is not great, whereas in the home range, it is stunning," says Ms Fugelstved. At the launch of Presario in late 1993 she predicted that at least 60% of these home market PCs would ship with CD-ROM drives on board, a figure which has been more than borne out by the first year's sales. It has to do with CD-ROM, she says, but also to do with the tremendous explosion of fun things to do with them.

Which brings us to the question of the point at which people decide that they really should have a computer at home. Research organisations have looked at the decision process which goes into buying a computer for home, and while they suggest that in most cases there's more than one reason, such as, "Well the kids can use it and I can use it as an extension of my office and bring home work", children are by far the greatest motivator.

Encyclopaedia Britannica for the 1990s

Whereas in Janis Joplin's day, parents would have scrimped and saved for a set of shiny red encyclopaedia to give their children the best opportunities in life, today's parents are looking to PCs to give them the early competitive edge. "People don't feel good about not having kept up," says Ms Fugelstved, "But they think, well, if I buy a PC for the children, they will have that opportunity, and I will have done my best as a parent."

Utilities such as Kid Desk, an interface which partitions off the computer into the names of the different people using it and allows each member access to preset applications and, in the case of young children, even predetermining the amount of time they can spend in front of the screen each day, have proved a popular adjunct to this machine.

IDC Research has isolated the multiple sub segments and influences on home PC purchase, as well as the rise in uptake of computers in this segment. In 1993, the company says 162,014 units were shipped into the home or home office marketplace. The projection for this year is that that figure will have risen to 237,000, experiencing a CAGR of 20.1% to the year 1998. The 1993 figure represented an 18.5% share of the total shipments, and a 17% share of the total value of shipments. The projected growth rate is the highest among computer-buying sectors including corporate, government, small business and education, causing IDC to predict that

**Children are the
greatest
motivating
factor in the
purchase of a
home PC**

by 1998, home computer sales will represent 26% of the total PC market in Australia. Some of these PCs are replacements for the old favourite home stalwart Commodore Amiga, while others represent a first PC purchase.

Given that children are the greatest motivating factor in the purchase of a home PC, it is interesting to note that IDC's research shows that over the same time frame, sales into the education market will rise only slightly, because the demand for computerisation will continue to outstrip available funds. There is tangible evidence to support the hypothesis that the growth of computers into the home is in some measure a community's attempts to compensate for the perceived deficiencies in its education system.

In its definition of a home PC, IDC discounted notebooks, which are primarily bought to be transported rather than used as purely home PCs, and also those PCs which are bought to be used in the home as the basis for running a small business from home. Since the primary reason for having the PC in the house is that it is the place of business, PCs of this category are classified in the small business section of the PC-buying market.

Included in its definition, however, are a myriad of different reasons for purchasing a home PC. Students are staring down the barrel of a tertiary and in some cases even secondary education system which, at least implicitly, requires the knowledge and ownership of a computer for many courses of study; home entertainment which goes beyond the non-interactive pursuit of watching television; domestic uses such as parents producing local community or school newsletters, as a repository for domestic accounts, correspondence or even recipe collections; software developers of either recreational or business products who use the PC to develop or modify applications; those people who work part time or who use the PC as a communications tool to enhance their access to sources of information; and the more prevalent use by executives who see the home PC as an extension of the office, or an opportunity to telecommute rather than travel every day.

The purposes for which the PC is bought dictate wide diversity in the specification chosen. The key decider about the kind of PC to purchase for the

home, according to IDC, is very often the secondary purpose for which it is bought. A family with grown up children, for example, will buy a significantly different configuration than a family with small children, or a household with none at all. The dynamic nature of the demands made on home PCs also offers significant opportunities for follow-on purchases of new software and peripherals. These key differentiators also affect the place where the PC will be bought, IDC suggests.

The traditional reseller is being overtaken by a plethora of new retail avenues offering brand names, back-to-vendor warranties and very competitive prices, especially in bundle deals. These PC and peripheral consumers also represent lucrative adjuncts to the everyday business of selling fridges and washing machines, so every effort has been made to attract and satisfy.

Harvey Norman, pioneer of the computer super store concept in Australia is reaping the rewards after its first year of operation. With 14 computer superstores and four mini computer superstores, the company claims a monthly turnover in excess of \$20 million. CEO Gerry Harvey says that it took his former retail endeavour, Norman Ross, 21 years to post turnovers of \$241 million, while the computer superstores have achieved that in just the first year. But he also concedes that while retailing computers presents an unparalleled opportunity, and the company is making megabucks, in the concept of retailing technology there's still a long way to go. "I'd say that fewer than 5% of people have been into a Harvey Norman Superstore," he said.

But the company's success bears out Ms Fugelstved's theory that familiarity sells. Harvey Norman has succeeded not because it built itself an instant name for techno-wizardry, but because it chose well, in the computer arena, as in the washing machine, television and dishwasher business. Customers, says Mr Harvey, don't want his sales staff to be experts, because if that's what they want they will go to the bits and bytes place down the road. They want the assurance of the Harvey Norman name as a reasonable guarantee of good suppliers, and they want the bulk buy discounts that such a chain can afford them. In a sense then, vendors are validated by being chosen by the retail giant, rather than the other way around. Strange logic, but it sells.

**Harvey Norman,
pioneer of the
computer super
store concept in
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reaping the
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Continued on page 102

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Consumer computing

m a g a z i n e s

BY ASHLEA MILLER

As a particular market grows, so often do the magazines catering to that market. The computer market has experienced consistent growth, mirrored by an ever increasing number of computer magazines. However, due to the market for PCs now expanding and diversifying, as well as the fact that 25% of Australian homes have a computer, a different type of magazine is appearing in our newsagents. Considering the steady growth rate that the home computer market has been experiencing, the possibility of success for these magazines is hopeful. However with every positive, come the negatives . . .

Computer consumer magazines started developing in America, thriving with a rising demand for home PCs. American publishing company Ziff Davis this year released a special issue called *Families and Computers*. Focusing on multimedia, the magazine has been designed to interest what it calls the "every day user". Closer to home, IDG Communications and Pacific Magazines Publishing have jointly launched a computer magazine called *Computer Living*. This magazine is directed at the computer consumer, giving advice and explanations about the use and technicalities involved in using computers. The magazine stresses that it is a family computing magazine, with its basic purpose to educate and inform.

Sue Ashton, editor of *Computer Living*, aims to involve the family by leaving out jargon and complex terminology and encouraging a practical approach to home computing. The introductory issue was bundled with Pacific Magazines' mass market women's magazine, *New Idea*, which has an audited circulation of a million.

The PC hardware market is already cutthroat, with far lower margins than most retailers are ever likely to be prepared to accept. At the same time, the consumer market is highly price and price-point sensitive. It expects high ease of use, quality balanced with value, and long product life. The cash is in volume.

It is this volume that will create a market for focussed titles. Companies like Microsoft with its Home Brand and WordPerfect with Mainstreet are producing software that is easier and more entertaining to use. Magazine publishers need to do the same. Not just the quality of the content is important for this market, but also its ease of absorption, which in turn relies on how interesting and entertaining its presentation.

Sales of both home PCs and CD-ROM drives have risen — with IDC estimating that 40% of the million-odd PCs shipped in Australia this year going into homes, and CD-ROM drives being installed on around 60 to 70% of them. The existing computer magazine market can only cater to a percentage of the new users fuelling this uptake of technology. An increase in the number of computer consumer magazines would broaden the perspectives available about different systems and products.

Mike Udbage, general manager of ACP Computer Publications (which publishes APC), feels that the question of growth in the home computing magazine marketplace in Australia is not "if" but "when". There WILL be more computer consumer magazines, he believes, but in the undetermined future.

In the United States, educators, and government officials largely agree that children who play with bits and bytes today will be better equipped for the workplace tomorrow. They agree that educational technology should be made a national priority. Parents should be encouraging children to learn more about PCs, as well as educate themselves to become more computer literate. With these opinions more computer consumer magazines would be advantageous.

The marketing strategy for these magazines will necessarily be different to capture the market that they target. Most magazines relating to a particular subject have traditionally been placed in one area of a newsstand. But this new variety of computer titles will need to be placed on supermarket shelves or alongside mass market titles such as *TV Week*. It's a strategy of identification by association. Consumers are more likely to be confident that a given title is suitable for them if it sits along with the other titles they read, instead of on the shelf next to a technical magazine such as APC.

Consumer computer magazines will not be suitable for all home users. As Richard Walsh, publisher of ACP, observes "Not everyone who owns a car buys *Motor* or *Wheels Magazine*". Many PC consumers are not going to be interested in learning more about their PC any more than a driver might want to know more than how to start a car.

Another challenge for consumer magazines long term is their necessity in a world of ubiquitous computing. The current market for *House and Garden* style magazines is strong but limited — for other specific consumer topics, such as whitegoods or home hardware, it's non-existent.

PC technology is already well integrated with office life. As more PCs make their way into schools and homes, and the next generation of kids comes through having always lived with them, the scope for consumer titles may become limited, because PCs become just another part of every day life.

For example, ATM machines, ticketing systems and cash registers are computer-based. People already use computers to some extent on a daily basis, whether they're conscious of this or not. We naturally become comfortable with our surroundings — and our surroundings increasingly include PCs.

The range of opinion about consumer computing magazines will broaden as more are published. Success in a consumer market is largely a question of brand and volume. How well their brands become known, and quite simply how well they sell, will be ultimate determinants of their viability.

Even for those interested in technology the computer magazine market is already crowded. However, as Mr Walsh believes, "those of us who now sit all day in front of computer screens can already testify to the sheer physical relief — to our eyes and to our neck muscles — of being able to turn away from the screen and pick up printed matter to read". The question will be how much consumers want to turn away from their PCs to find out more.

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Rise above the ordinary workplace with screen wallpaper Renoirs, Van Goghs or the ceiling from the Sistine Chapel. Program a Yes man to agree with your every move or read the ever-changing best story of Dick and Jane. The developers describe the package as "Accessories with Attitude", and they're not wrong. Choose from a number of simply psychotic screensavers, from manic paint splashes to accidental streakers, teeth cleaning or energetic oerbots.

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Dangerous Creatures

An exploration of the habitats and lifestyles of the world's most dangerous and endangered creatures. Define by tooth type, colour, appearance or feeding habits, or be taken on guided jungle tours or listen to mystical story tellers. Simple games and puzzles reinforce the message. Buying the software will also support WWF. See Bibliofile for more details.

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by Microsoft \$99 (02) 870 2100

Ancient Lands

This CD will transport you back to ancient Greece, Egypt or Rome for a dose look at tales and real life. The scenes at the Colosseum will put the modern day Mortal Kombat in the shade, while the guided tours of street life BC are an easy to digest ancient history lesson. There are almost a thousand interactive articles and hours of sound and video. Interwoven into the narration and facts are a series of games and matching puzzles, and a choice of screensavers.

on CD
by Microsoft \$115 (02) 870 2100

Encarta

Recognised as the premier encyclopaedia on CD, Encarta is updated yearly. The 1994 edition is soon to be eclipsed by the Windows95-ready version, but if you want something knowledgeable in the kids' stocking, you could do worse than buy this one. Find reference to everything from the Ottoman Empire to JFK, with carefully calculated timelines of world



BY HELEN DANCER

history which provides a valuable correlation of cultures and historical events. An image browser, on the other hand, lists the pictures and clips that are available, nearly 7000 in all. The pack boasts many awards from the IT and educational arenas, and is recommended for ages 9 and up.

on CD
by Microsoft \$159 (02) 870 2100

Math Workshop

One gorilla, 10 bowling pins and hundreds of puzzles. Maths for kids from six to 12, or beyond, hosted by Poly — short for Polygonzales, of course. Broderbund has excelled in creating a maths program which explores spatial concepts, and gently and graphically introduces simple estimation, pattern recognition and logic concepts, progressing within each game "to reasonably complex levels".

on CD
by Broderbund \$84.95 Dataflow (02) 310 2020

Where In The World Is Carmen Sandiego? — Junior version

What better way to learn the world's geography than by going there? The search for Carmen Sandiego and her thieves can take a player anywhere in the world, following clues and interacting with the computer to eventually catch up with the criminal. The new graphical version is designed with critiques of previous versions in mind, and is much more attuned to young minds, and the problems associated with nascent computer usage.

on CD
by Broderbund \$79.95 Dataflow (02) 310 2020

Kid Pix Studio

Junior creativity pack which makes the most of multimedia technology. Create a singing picture, add animation, add groovy stamps to pictures or create video postcards. Delightful tools to let children experiment with sound, shapes and colour. Hoops of fun for 3 to 12 year olds.

on CD
by Broderbund \$99.95 Dataflow (02) 310 2020

PC Dining

Sydney-based software publishers and designers, Data Diction recently announced the release of Melbourne and Canberra editions of "Which Restaurant?". This follows the launch of the Sydney edition earlier this year and we are told that a Brisbane and Gold Coast version is on its way. Each edition is contained on separate floppy disk, and can

either be installed to a hard drive or run from a floppy drive. In an age of "killer apps" which require equally killer hardware, "Which Restaurant?" is a welcome change, requiring only Windows 3.1, 16MHz 386SX, 2 Mbytes RAM and VGA monitor (colour or mono). And it's available at your local newsagent!

Managing Director and software developer Rod Sharples has had a lot of experience building software for non-computer users, and as a result, "Which Restaurant?" is a snap to use. The online help takes all of five minutes to read, but the guide's interface is so intuitive, you probably won't need any help at all. And it's fun to use too, almost like a game.

Details given are: name, address and phone number of the restaurant, the food type, whether it's open for lunch and/or dinner and on which days, whether it's licensed or BYO, smoking or non-smoking, and the average price of a main meal. Any one or more of these can be used as criteria when searching.

There's no review of the restaurants nor a menu, but these are being considered for an add-on disk. An accommodation guide is also envisaged by Mr Sharples as well as an online service.

This is a great Christmas gift idea for anyone who has a computer. It's only \$9.95 and you can subscribe to the six-monthly updates for \$15 per year. So get down to your newsagent. This is perfect stocking stuffing.

on disk
by Data Dictionary \$9.95 Newsstands.
Roban Singh

The Way Things Work

"Inventor" David Macaulay describes this package as a "mammoth" guide to a world of inventions and machinery. You can explore everything from levers to telephones, the remote control on the TV, a camcorder or a toilet tank, all lovingly illustrated, and cleverly animated and narrated. One of the most endearing aspects to the package is the woolly mammoth which Macaulay uses to humorously demonstrate some of the scientific principles behind these various inventions. Great fun, in a surprising way.

on CD
by Dorling & Kindersley \$199.95 Roadshow New Media 1 800 675 604

Stephen Biesley's Incredible Cross Sections - Stowaway

If ever you wanted to know intimate details of an 18th century warship, then this is the kit for you — you can "talk" to each of the crew members about their responsibilities, and life on board a fighting ship, take a tour around the ship, from the rigging to the galley, or watch gruesome on-board surgery, pre-anesthetic style. There's also the game of find the stowaway — who hides in each of the levels of the boat. Discover him in each of his hiding places and uncover a secret.

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on CD or 3.5in disk
by Chaos Concepts CD \$89.95 Floppy disk \$49.95
Vision Shareware (08) 373 4469.

Nat Tunbridge

Vid-Grid

Vid-Grid is one of those packages that makes people go "oooh" when first loaded, and "poooh" within a few minutes afterward. Surely it's not another purposeless exercise in multimedia chicanery masquerading as a game? Hooster! It cannot be! Or can it...?

Is it a hopeless waste of money? Yes. Unscramble nine music videos while they are playing. That's it. I became bored with this only minutes after I loaded it. A classic case of admittedly good looking frills and no content.

on CD
by Jasmine Multimedia \$69.95 Sega/Ozisoft (02) 317 0000.

Nat Tunbridge

Australia's Reptiles

Video clips of snakes hunting and devouring small mice are a graphic highlight of Natural Learning's Australian Reptiles Volume 1. It's an action-packed CD-ROM filled with skulking serpents slithering about their daily activities.

It has over 260 high resolution pictures of monitors (the large lizard variety) and terrestrial snakes and was designed for the educational market,

which explains why most of the reptilian lifestyle snippets were available as video clips, except for the mating experience, which was a still photograph!

on CD
by Natural Learning \$99 (02) 875 3627.
Cotton Ward

Australia-On-Disk

Throw away your old phone books! Now your social life will be at your ink-free fingertips with the CD-ROM Australia-On-Disk business and residential directories.

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Australia-On-Disk is available individually from
Brylar (02) 787 4255 for \$350 per disk or as a boxed set for \$550.

Cotton Ward

From page 94

On the vexed question of the price at which it should sell, Mr Harvey is adamant that pricing in Australia should more closely reflect American pricing, and maintains that the result would be a dramatic upturn in business, and better returns for the vendors involved. Even Ms Fugelstved concedes that the optimum 'sweet spot' for the consumer market is closer to the \$2,000 mark than current prices, but maintains that more customers than ever before are looking at the package they get for the money and deciding that it is good enough to warrant taking the plunge. It's a big ask, however. Both Mr Penn from IDC and Ms Fugelstved concede that in the consumer sphere, there's very little else at that price point, other than lounge and dining room furniture, which Mr Penn describes as passive, and therefore not directly comparable.

Wonderful things

Feyna Oman from Broderbund has a different spike on the birth of the consumer computing explosion. "It started with software," she asserts. "When people realised the wonderful things they could do with CD-ROM and the products that were available on CD, it made the purchase of the hardware to make it possible a real imperative."

The change in momentum, from the games and children's education market perspective, is that the rise of CD-ROM has seen the purchasing power switch from dedicated games machines to CD-enabled PCs. "The games machine gave people the ability to directly access what we had to offer, but PCs are seen as a more useful all round buy. The ability to justify the expenditure by having two or more reasons for having one in the home further validates the purchase," says Ms Oman. "You can't bring home your office work to a games machine, but by buying a PC you can also look at it as a education buy for the child — it's a further validation in a sense."

While the traditionally business-oriented software companies such as Microsoft have spent the last several months concentrating on evolving strategies to woo the consumer marketplace — see "Home Sweet Home Branded" on page 105 for companies such as Broderbund who were in on the consumer ground floor — it's pretty much business as usual. "We grew our business 38% in the last year, worldwide," says Ms Oman. "In Australia that growth was proportionately higher, around 40%." Sole distributor Dataflow mirrors the software developer's success. "Two years ago, CD sales represented just 2% of our sales; today it's closer to 20%," says marketing manager Murielle Paviet.

Floppy disk based delivery is on the way out, Ms Oman signals. While 40% of Broderbund product was shipped on CD last year, the current quarter's 15 new titles will all be shipped on CD, and the coming quarter's 11 new titles will also be CD-based. "We're putting all our eggs in the basket," she laughs. "That's how confident we are."

The availability in the home of much of the material designed for early education and classroom use is blurring the boundaries between school learning and home recreation. Phil Mellifont, Dataflow's education market consultant observes that computers are already changing the face of schools as we knew them. "The PC doesn't replace the blackboard, but represents a tool of the future, here and now. Teachers who are doing a good job are therefore those who are acting as facilitators of learning, not founts of all knowledge."

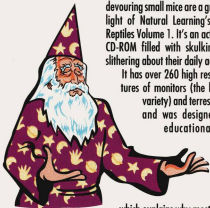
Ms Oman rejects the notion of giant screen PCs replacing blackboards in the classroom of the future. "Blackboards were invented to cram more kids into the classroom and to present more information in a more structured way," she said. "The PC-assisted evolution in the education system is one characterised by smaller groups, more interaction between the members of each group, and learning by assimilation, not by rote."

Ride the info-bahn to your door

The role of education into the future, while inextricably linked to the idea that children can continue the learning process effectively in the home, is necessarily dependent on the evolution of aware and timely government policy to guide and regulate both the development of education and cultural policies, and the rampant development of the so-called information superhighway which will allow its delivery.

There are as many visions of the consumer PC for the future as there are vendors and providers. Apple Computer's managing director Steve Vamos sees a broad diversity of PCs styled for different purposes. In a recent interview with *APC* he described the home PC as a tool which will deliver all the much-talked about services like video on demand, computer games, and that pipeline into the home from a range of other services that are currently associated with other media.

The one aspect all agree on is that it will probably be fed in the medium term, not by disk or even CD, but by online services, broadband links to both education and entertainment, business information and even broad consumer needs, like virtual shopping centres, buy buttons, credit card





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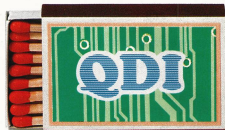
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registration panels (see "Personal Finance on the I-Bahn" on page 114) and home delivery. Great for the next generation of high tech agoraphobes. Like the couch potato syndrome of the 1980s, the next decade may breed a race which never goes out, and for whom geographical boundaries have no meaning, but who stay brilliantly informed, networked together at high speed.

Putting aside the future-schlock, the development of both a multimedia industry and, more significantly, of Australian indigenous content, has received a well-conceived boost by the announcement in the government's Cultural Nation policy of a five year, \$84 million development fund for local multimedia enterprises. Microsoft's director, Asia Pacific region, Daniel Petre enthusiastically describes Prime Minister Paul Keating as "one of the few people at that level who actually, personally gets it". The fund will be co-ordinated by the Australian Multimedia Enterprise, and will commission CD-ROM-based products reflecting material from what the Prime Minister describes as "major cultural institutions", to be used in Australian schools.

The policy also makes valuable provision for the better protection of copyright. The new media opportunities afforded by technology also leave artists and developers open to a greater incidence of intellectual property theft and unlawful reproduction. Part of the policy, therefore, is the provision of a million dollar grant to set up Viscopy, a copyright collecting agency for the visual arts. The agency will ensure that artists and content providers obtain proper financial return for the use of their work, Mr Keating emphasised. He also outlined the financial advantage to copyright owners in the growing ability to reproduce visual images. Those artists and content providers whose work is frequently reproduced will come to regard the medium as an increasing source of income from royalties, he said.

The policy, though delivered as a federal initiative, is seen as the product of a prime ministerial passion. Both the arts and technology have been hot issues for the Prime Minister since his election; indeed he was extremely keen to meet with Microsoft founder and CEO Bill Gates during his visit to Australia earlier this year. It is no coincidence that the portfolios of Arts and Communications were amalgamated, says Bob Bowden, press relations officer for Michael Lee; the two are intrinsically linked in the government's

vision for Australia's path forward. Mr Petre concurs. Mr Keating's recognition of the importance of developing a local industry both from the point of view of export opportunity and cultural identity, he says, is unparalleled.

The release of the policy is auspiciously timed. Planned since before the last election, according to Michael Lee's office, the policy was anticipated to be ready last

March, but visions and revisions saw it put back until October. The Creative Nation statement, according to the Prime Minister, does not attempt to impose a cultural landscape on Australia, but to respond to one which is already in bloom. Apart from the implications for the more traditional aspects of culture such as dance and drama, it also dramatically improves the prospects for the nascent multimedia development industry

in Australia, and marries the two, in terms of form and content. It also addresses the government's need to get involved, lest it be left behind. In the announcement of the movie studio to be established by News Corporation and its film production arm 20th Century Fox, and the opportunities this offers for development in other media, notably technology derived multimedia, the government has signalled a clear understanding of commercial reality. Powerful media players such as Rupert Murdoch will inevitably push the frontiers and if there is no Commonwealth involvement in the short term, then government interests and national agendas will simply be bypassed.

The future: Couch potatoes in cyberspace?

The home PC has far greater implications than the better education of your child, telecommuting executives and a multimedia full-colour electronic version of Mrs Beeton's cookbook. *Fortune* magazine reports that there are many in the multimedia development industry who see CD-ROM as merely a dress rehearsal for the preparation of content for online services.

They bravely assert that CD-ROM is a passing phase; that it is characterised more by its limitations than its capability, and that its function in the greater scheme is as a stepping stone to the concept of higher capacity, truly multimedia content, delivered online, straight into the home.

It is a future in which children will still go to school, because of the essential socialisation and interaction that the venue offers, but they won't carry books or bring homework with them at the end of the day.

Rather their home PC will be connected, not only to their own classroom, but to a myriad of other classrooms across the country and beyond, to libraries, publishers, and centres for higher education. They won't sit in large classrooms facing a blackboard, and learn by being told the right answers, being expected to reproduce knowledge in paper-based tests. They will congregate in smaller groups and interact both with real and virtual teachers, real-time video, multimedia learning tools, and most importantly, with each other. The collaborative process has already begun, says Mr Mellifont; multimedia can only improve it.

LAN and WAN access, wireless and satellite communications will play as much a part in defining the changing workplace as consumer computing. Symantec's sales force in the US is almost totally SOHO-based. Executive vice president, worldwide sales John Laing told *APC* that the choice between expenditure on office space or higher commissions was speedily made and universally acclaimed, and that the company's sales force profits from its spatial and temporal independence. However, it's a quantum leap of gold medal proportions to assert that consumer computing and the coming online revolution will overturn the traditional business base. Certainly it will augment current communication modes and significantly enhance our ability to do business, but there is something inherently social about the human animal which craves communal space and face to face interaction, and which will always resist the encroachment of virtual offices.

The challenge is for equal participation in both the provision and use of online services. Feminists such as Dale Spender have heralded ubiquitous computing as both a significant opportunity and an area of concern; that women should seize the medium as a way of transcending the workplace/home-and-hearth boundaries. These concerns are echoed in statistics which warn that a mere 9% of CompuServe users are women. It is indisputable but unavoidable, that for the majority of women who have had access to technology through the workplace, that access will have been limited to character-based data entry, or even GUI interfaces to word processing and computation applications. It will rely on Ms Oman's "wonderful things" to persuade such women that it is worth spending recreational time sitting in front of the screen which they commonly associate with boring repetitive work-day tasks. It is possible to look disparagingly at a future of socially retarded couch potatoes in cyberspace, but in the end, it is too cynical a vision. The reality is much more vital, and holds infinite opportunity. ▲

**Powerful media
players such as
Rupert
Murdoch will
inevitably push
the frontiers**

As well as a marked rise in the number of PCs passing over the front door step, there has been in software sales into the blame. So much so that most of the major corporations are actively distinguishing the products they sell into the home market.

Microsoft has made a big impact with its "Home" range, WordPerfect has been promoting the "Main Street" series of products, and companies like Claris, Micrografix, Borland and Broderbund have all made their play in this specialist yet rapidly expanding field. According to Microsoft's product manager for the Home range, Leanne Barnes, the predicted growth in this area is some 200% this financial year.

"We are experiencing very big growth in sales with our multimedia CD titles such as Encarta, Dangerous Creatures and Cinemania. We are putting together a special Christmas bundle, and will soon be launching a two million address direct mail campaign for the whole range of Home products," she says.

Walk-in buyers

Although the "home software" bracket is often seen as a range of bright and breezy children's games, a few reference CDs and a paint program or two, the software houses definitely see it as much more solid than that. The "home" nomenclature can range across anything from fully integrated entry level packages — such as Claris Works — through to Microsoft's Cinemania and WordPerfect's InfoCentral PIM. It also seems the software companies are less keen to classify this niche as rigidly as they used to label the corporate market. The "home" bracket is distinguished more, it seems, by the purchasing method and type, not the use to which the software is put. In most cases, each package is purchased in single units by a customer who is "shopping" for software. Accordingly, the likelihood of multiple purchases is much less than conventional "office" suites.

"We see this market as split into two basic streams; the personal productivity and leisure markets," says WordPerfect's Leonie Cridland. "The former can cover small to medium businesses, but also the use of integrated packages at home for finances, newsletters and addresses as well as school homework."

Cridland sees a very rosy future for the category, especially in the local market which is reporting growth rates of up to 30% for SOHO packages and 18.5% for home and leisure packages. These are both much higher than the corresponding uptake rates in the next best market; the US. As a result, it seems most companies in the market are

working on their strategies to make sure they grab a good slice of the home pie. Microsoft is planning a direct mail blitz and a stream of new releases — 80 to 100 titles next year predominantly on CD-ROM. WordPerfect is moving into areas previously unimagined for the previously WP dominated company, with new releases featuring paper plane design, adventure games and other educational titles as well as a new version of Works for Windows.

Major corporations

Claris, one of the less publicised players in the industry, proffers a slightly different scenario.



It contends the rise of computing in the home will lead to a new generation of generalist users who will likely use the same software at work, school and home. Claris MD Australia, Patrick Maloney, sees a move away from "office" suites to more usable "home" style packages across the board. "We believe that before the end of the year we will see at least one major corporation going over to ClarisWorks. Already Optus is using it in its retail outlets, and say they are finding it provides all the functionality they need," he says.

Maloney says there are tremendous opportunities for companies such as his to spin off advantages already gained by good penetration into the schools market. He cites the positive aspects of his products' single file format which allows home, school and office to use the same files across both Mac and PC. "I suppose the angle we are taking is a customer focus for our products. We see the (home) software as trying to be all things to all people, and we recognise we can't do that," he said.

WordPerfect is also taking a slightly different strategy to Microsoft. It is not taking the "hearts and minds" approach the upcoming Microsoft direct mail campaign will introduce. Instead, it is looking at the standard "home" buyer as a repeat buyer of

commodities, with little brand loyalty expectation. As Cridland puts it, the new home software buyer is learning to demand the products it wants, but is quite ready to buy Microsoft Encarta for the children's homework then WordPerfect's Paper Planes to amuse them next shopping trip.

Small is still good

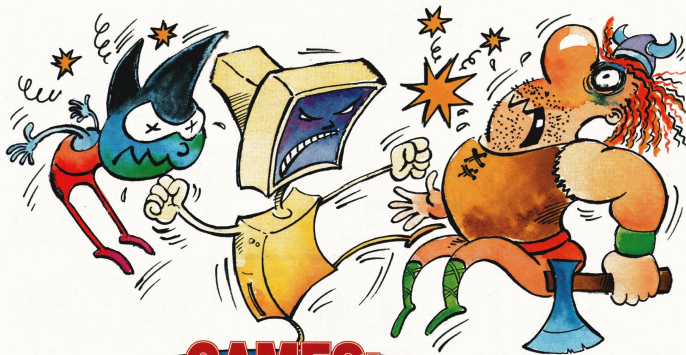
Despite some claims that the entry of such retailers as Harvey Norman — as well as the likes of Grace Bros, Myer and Brashers — into the home software market would kill the small retailer, the evidence does not support this, says Microsoft's Barnes. She says the smaller, traditional computer stores are still providing a better service to the home software customer than some of the larger retailers. Accordingly, Microsoft's sales push will still be through the more traditional outlets as well as the bigger mass retailers.

"When we examined the figures, we found that the smaller stores were still selling these (home) products very well for us. Lots of people are still going to them for our titles; possibly they think they are getting better help on installation and so on. The situation may change in the future with the (big chains) becoming more important, but definitely not at the moment."

So the stage looks set for a real war between the major software houses for the biggest plum on today's software tree. Are prices likely to drop? Not according to most industry commentators. It looks as though most "home" software will crystallise into one of three categories. Integrated Works style packages will sell for around \$300, edutainment CD-ROMs for around \$100 and other games within the sub-\$100 bracket. But whatever the outcome for the industry, you can be sure the quantity, quality and value of these new, easy to use and entertaining packages will continue to rise.

Only one question remains unanswered — where is Lotus in all this frantic home based activity? Marketing director for Lotus in Australia, Mike Clarke, says the equation for walk-in buyers is based not on a different category of products, but a different method of promotion. "We now find about half of our walk-in buyers are home buyers and we are very pleased with our sales of SmartSuite in this area. The reason we are not developing cut down or specialist 'home' software is that we are selling them the real thing rather than a lesser version. We are sticking to our knitting, but bringing our products to a wider audience through extensive multi-page advertising in magazines like *Who* and *Good Weekend*," he adds.

Jeremy Torr



GAMES: the driving force

BY NATHANIEL TUNBRIDGE

The first computer game I ever played was the 1977 classic Lunar Lander. It was more of a physics experiment than a game, offering the player the delights of piloting a module that was falling to the surface of the moon. It was black and white, there was no sound and the graphics consisted of various keyboard characters (!@#\$ and so forth) arranged to look roughly like a spaceship. I can't remember what it ran on, something that looked like a giant brown brick, and possessed a similar level of processing power. The idea was to modify your thrust so that you were travelling beneath a certain speed and could thus land safely when the moon's surface arrived. Even then, however, people took greater delight in finding how fast they could be going when they hit the moon. Way before DOOM, carnage was all the go.

Games and the hardware they've operated on have always enjoyed a give-and-take relationship. Ever since the first, ponderously slow text-based adventures sprang up around the earliest mainframes, the two have advanced hand in hand, the demands of the former always encouraging new growth in the latter. The first arcade games, such as Space Invaders and Galaga, quickly found their way into the

home via dedicated game units. Cartridges for these units would contain either basic versions of familiar games (for instance, chess or draughts), or copies of arcade classics. In England, where I grew up, it was the arrival of Clive Sinclair's ZX81 that first revealed home computing to the general public, and home gaming was right there along side, pushing the little machine to its limits with scrolling graphics and even 3D space combat simulators! With its BASIC interface the ZX was ideally suited to first-time programmers, and it sold like hot cakes.

Not as well, however, as its successor,

The first arcade games, such as Space Invaders and Galaga, quickly found their way into the home via dedicated game units.

the ZX Spectrum. With only 16K of RAM, the Spectrum nonetheless became an essential attribute for any teenager interested in gaming. It offered colour graphics and blippy sound that seen prehistoric now, but at the time was the best thing we'd ever seen. *Sans* hard disk and sound card, the Spectrum nevertheless entertained some

marvellous games with its tiny memory. The title that really stretched the envelope, however, was Manic Miner, written by English coder Robert Smith. This boasted an unheard of 20 levels (20!) and achieved a feat that had always been considered impossible; music and movement at the same time! I spent many, many hours of my youth directing Miner Willy through the tricks and traps of this classic platform game, as The Hall of the Mountain King twiddled away in the background. Teenagers and pre-pubescent around the world did likewise.

The symbiotic relationship between the ZX Spectrum and Manic Miner was just one of the first examples of the capabilities of the killer app: An application, be it a game or a spreadsheet, that breaks through to a new level and causes people to buy a system simply to run it on. Impressive multimedia CD-ROMs such as Encarta can sell a top of the range PC system no problem, but the real use the machine is put to is another matter. Graham Penn from computer research company IDC explained: "In the home environment the justification [for buying a PC] is that the kids will be helped with their school work. What happens is

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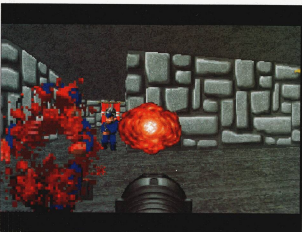
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that over half their time is spent playing games."

Having worked in sales for many years Tony Gattari, national computer co-ordinator for Harvey Norman, is well aware of the dichotomy that exists between a customer's stated intentions for a PC and the reality. "I've sold a lot of computers," Mr Gattari told *APC*, "and I've never heard anyone say 'I want to buy a computer to play games.' They say they're buying it for business purposes, to help their kids' education and so forth. Then they come in a week later looking for games. No-one will actually admit to spending \$3000 on a games machine, but the idea is in the back of their minds."

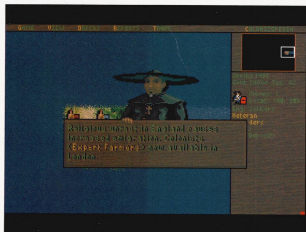
Mr Gattari indicated that most of the customers he dealt with had a skewed idea of what computers were capable of. Most people wanted something that gave them "a better tool" than the one they had now. "I found the most effective demonstration was to play the JFK speech from Microsoft's Encarta," Mr Gattari enthused. "Quite often that would result in a sale immediately. People would be amazed that a computer was capable of that." Mr Gattari felt that games had come into their own because of multimedia, and that CD-ROM had as-



Pump that chump! Games such as Doom raise the question of psychological side-effects

sisted the games market extensively. He mentioned that 75% of Harvey Norman PCs are sold with CD-ROM drives pre-installed. As for the effect that a computer can have in the family home, Mr Gattari was adamant. "I'd rather have my kids playing a computer game than watching TV. They're developing strategic thinking and various other skills. However, as a parent I'd be very careful about what I bought my kids."

The popularity of the ultra-violent DOOM PC game and its even gorier sequel has brought into question another aspect of the influence that games have on the



In Colonization, the latest from Civilization creator Sid Meier, religious unrest is the least of your problems

consumer market: To what extent is entertainment affecting us psychologically? While the effects of violent media have long been the centre of debate, not a lot has been said regarding the positive effects game playing may have.

Chris Johnson, lecturer in Information Systems at the University of Technology, is of the opinion that so-called 'guns and butter'-style strategy games reinforce management skills and help support the planning of sensible objectives. "Strategy simulations are actually very beneficial," Mr Johnson said. "Civilisation is particularly good in this regard. You have to discover science, build cities, explore the world and interact diplomatically with other nations. To do this you have to make a realistic plan with significant choices that has to be adaptable to the inevitable problems that occur. It's like living in the real world." Mr Johnson also pointed out that violence and money, two

of the most popular subjects in games, were not accorded much respect in *Civilisation*. "War is very negative; it's a waste of resources, and money ceases to be something of great use after a while. Life is about a lot of organisation and planning, and this game hones those skills. Every person in a management position should play this!"

When queried about the many violent combat-style games available, Mr Johnson indicated that the true negative effect of such titles lay not in the graphics but in the underlying message. "The shoot 'em up games represent a waste of people's time,

because you do the same thing over and over again and there's only one ending and one way to get to it. There's no way to influence story development." And *DOOM*? "I've played it but, again, it's a waste of time. The real reason it's been so successful is the 3D engine. The gore is the icing on the cake." Ideally, Mr Johnson said, he would like to introduce a *Civilisation*-style teaching aid to his university courses.

Technically, games have been developed in a separate environment to business applications, but the increasing incidence of multimedia techniques in games has led to points of commonality being found between the two areas. Lou Scillaci from Creative Pacific indicated that there was a limited but real crossover point between the two.

"When a business interface is being put together, research labs spend an awful lot of money finding out how people are going to approach the application and what they want it to do. With games, the gameplay is the most important thing, and the interface is secondary to that. The multimedia titles that are appearing now require quite a varied staff; a producer, a graphic artist and so forth, and the graphic artist will be a freelancer who could be working for Origin or Microsoft. He makes an attractive interface regardless of the content."

The complexity of many games had led to the need for large amounts of information to be displayed, and made easily accessible to the user, exactly the requirement that has been levelled at business applications. Take a peek into an in-depth strategy game such as *Harpoon* or *Warlords 2* and you'll find a menu bar almost as detailed as any in Windows. Of course, no-one ever said an interface had to be boring.

The Mosaic graphical browser, which allows users of the Internet to access electronic information, has incited a wave of excitement amongst net-folk. According to a report in *Wired* magazine, "Net traffic devoted to hypermedia browsing has increased ten-thousandfold". Mosaic goes to show how important entertainment is even in sober applications. It's not the most direct or powerful way to locate information online, but it is the most enjoyable. The result? DEC in the US is shipping an enhanced version of Mosaic with every machine, and Microsoft is keen to take out a licence. ▲

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Home appliances



There's more to catering to the home than software bundles and a multimedia kit. APC looks at three PCs with fair claim to the title "Consumer PC", but finds manufacturers are still on a learning curve.

PC manufacturers are slowly learning how to produce PCs geared towards a market that isn't enthusiastically technical — the home. They're not at the level of the VCR or microwave yet, and never will be, but units are appearing that meet more of the criteria you'd expect for a PC aimed at the rumpus room.

There aren't many, however. In this section we sample three we feel are genuinely consumer-oriented.

There are four clearly definable trends evidenced here: Modularity, better synthesis of hardware and software, preconfiguration, and custom operating front-ends.

The bulk of the PCs pitched at mum, dad and two kids (MD2K) could more properly be termed 'complete' than consumer. That is, these units are reasonably specced, include a CD-ROM drive, sound card and speakers, with operating software preinstalled and a limited variety of interesting software. Sometimes they'll include a modem.

This should, however, be the basic configuration of most PCs.

Communications capabilities are already essential. Online services are expensive and the Internet access complex, but being online increases the scope of computing powerfully. Next year will see online access increasingly bundled out of the OS box, a trend underway with OS/2 Warp, close to happening with Apple's eWorld, and likely to climax with Windows 95's Microsoft Network, codenamed Marvel.

Similarly, CD-ROM isn't a convenience, it's a necessity if you want to be able to run the bulk of the best software hitting the market. It's also the only feasible method of installing software without wasting hours.

These components should be prerequisites. The arguments against them being bundled out of the box — that this removes user choice and many of us could assemble a higher quality package ourselves inexpensively — are valid for a technologically literate market. But not more so than arguing that drives and graphics accelerators should be omitted. In any case, it doesn't hold for PCs sold to MD2K.

Therefore, to be a consumer PC, you need to be more than a bundle. The Packard Bell and AST PCs both approach the model differently, and each has strong elements of consumerism. But only the Presario completely eliminates the wires and setup headaches.

Of course, the Presario is neither alone nor perfect. Apple's Performa has for some time offered a bulk of the features we list here as necessary qualifications for a spot in the sunroom, and ease of use and setup still unparalleled under DOS/Windows.

Despite the often lower than desirable specs, especially on the bundled fax modems, these three PCs are a solid argument that the PC industry's complexity complex is being tamed. They also suggest that there's been a realisation that while "consumer" may mean sensitive pricing, it doesn't necessarily mean brain-dead configurations.

Jeremy White

AST Advantage

The AST Advantage series offers few surprises in either performance or features. However, the Advantage has a strong configuration and a price to keep most consumers happy.

Opening the lid on the large footprint desktop case reveals a tiny motherboard that is home to a Cyrix 486DX2/50 motherboard with an anodised green heat-sink. Only two SIMM slots are provided with 8M, although it can support up to 32M. Upgrading the memory would involve replacing at least one SIMM. A well-considered touch is the 10-cent-piece sized Lithium on-board battery that is held in place by a battery socket rather than soldered to the board.

A riser board has three ISA slots. This is a welcome alternative to vertically placed cards that are often hindered by processor location. Only three slots, rather than the case's possible five, are provided, again limiting the expansion.

The case is a standard desktop unit and has two 5.25in externally accessible expansion slots and one externally accessible 3.5in bay occupied by the floppy drive. The Quantum ProDrive 270M hard disk is slung under the floppy drive, held in place by just three screws. There is room for a second drive. Interestingly the hard drive and the CD-ROM drive are connected through the same disk controller integrated on the motherboard. This drive controller configuration performed admirably with a Disk WinMark of 498 and a Disk Harmonic of 771.

The local bus video controller is also integrated into the motherboard. The controller includes 1M of video RAM and gave an acceptable Graphic WinMark of 5.57 and a Video Harmonic of 4022. The digitally controlled 14in SVGA monitor provided was expensive but far from inspiring.

The Advantage includes a SoundBlaster kit: the sound card takes up one of the valuable ISA slots. The kit in the tested unit had a 16-bit SoundBlaster card, Mitsumi CD-ROM, microphone and a pair of external speakers.

Of course, the machine is supplied with MS-DOS and Windows 3.1 and it also ships with Multimedia Works, Encarta, Cinemania, Golf and Entertainment Pack.

The machine has two 9-pin serial ports, a parallel port and the sound card has a MIDI-interface/games controller port. A PS/2 soft-touch keyboard and an acceptable PS/2 mouse round off the package.

\$2,999 is good value for a machine with sound card, CD-ROM, 8M of RAM, a host of software and a 12 month warranty from AST. While the machine would benefit from a larger hard drive and additional SIMM slots the Advantage is worth considering.

Ben Gerbolt



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Packard Bell PB6042PMM

At the top of Packard Bell's current range is a multimedia Pentium 60MHz PC. It comes with a PCI expansion bus, 8M RAM (expandable to 72M), 420M hard disk, 256K cache and an internal Bankia 2400/9600 bps fax/modem.

Some thought has gone into making the PC as accessible as possible to the novice, with a relative wealth of simple utilities that proved surprisingly capable. Packard Bell's Navigator software is included, sitting on top of the Windows interface to provide a friendlier introduction to PC computing and perhaps a more organised workspace for experienced users. Of particular interest is the cleverly-designed children's workspace. Program Manager runs concurrently with Navigator, and those who prefer regular Windows will not be affected.

A large number of installed programs and a packet of CDs are included, with titles ranging from Microsoft Works and the Grolier Encyclopedia, to educational titles and a game.

Out of the box, the Packard Bell is aesthetically pleasing and relatively easy to put together, though separate power cords for the CPU, monitor and speakers makes for a tangle of cable. A large sheet of paper with clear diagrams is provided and most of the connectors are colour-coded. The manuals are well-designed, but there is usually no need for them, thanks to comprehensive multimedia tutorials which are instantly accessible on start-up (if you don't mind the strong US accents).

The 420M Conner CFS420A hard drive achieved a Disk

WinMark of 492 and a harmonic of 499, which could have been better. The 16-bit Forte sound card is more than adequate, with Sound Blaster Pro emulation and tall speakers designed to be attached to the monitor (although clip-on would have been preferable to screw-in attachment), and the Panasonic CD-ROM drive sets a good standard.

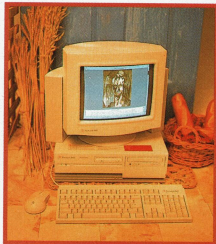
Three ISA slots and two PCI slots are present, with Plug and Play drivers included, but the sound card and rather bulky modem mean two of the ISA slots are already taken.

A video fault seemed to occur regularly when running complex graphics — photographs under Windows, some of the packaged programs and particularly the game DOOM 2 suffered from a kind of video decay, where a screen update would often introduce ugly, luminescent colours — the only cure seemed to be to wait for or force another screen refresh. This was very irritating, though a graphics Winmark of 19.2 was set, with a Video Harmonic of 3971. The integrated PCI graphics controller is a Cirrus Logic GD5434.

The Packard Bell turned in a below average Winstone 94 score for its type of 53.5 and a DOSMark of 655.17, though the potential power of the Pentium chip makes it more of an investment than high-end 486s.

The 14in monitor provided had a deceptively large surface area compared to the amount which could actually be used, and the default Windows video driver was designed for a larger screen — not at all pleasant for a novice user. The awkward-looking Packard Bell mouse was surprisingly comfortable to use, as was the keyboard.

Including a modem as standard (even in some lesser models) is a step forward, but a 2400bps device will not be



adequate for today's bulletin boards or the Internet. Without a 14,400 bps modem, the technology levels set by CD-ROM, 16-bit sound, Pentium and PCI are seriously let down.

At \$4,695 the PB6042PMM is not cheap, but must be admired as a relatively successful attempt at combining hardware and software to create a home PC that will last a good number of years. Expect demonstrations of the capabilities of this type of machine to result in a sales explosion a few months down the track, once the price falls.

Simon Vandore

Compaq Presario CDS 520

October this year marked the first anniversary of the Compaq Presario range and a revamping of the line to include many of the features neglected on earlier models.

Designed as a consumer PC for the home the Presario range incorporates many innovations not found on conventional desktop machines.

The most obvious of these is the all-in-one CPU and screen configuration. This avoids the tangle of cables and peripherals such as external speakers, microphones, VGA and power cables that often occurs with multimedia PCs. The only connections that have to be made are the keyboard and mouse, and to plug it into the mains power. Also integrated into the design is a US Energy Star compliant power down mode for both the hard drive and monitor. When powered down the PC uses approximately the same amount of power as an incandescent light bulb.

Correcting a few of the shortcomings of the earlier Presario models, Compaq are now offering a fully integrated solution to multimedia consumer computing. Two of the biggest changes in the line-up are the inclusion of a double speed CD-ROM drive and a 2400/9600 fax/modem.

Unlike many multimedia PCs, the Presario range is designed around its multimedia capabilities. The stereo speakers are housed on the front panel and a microphone is embedded in the casing at the top left. A far neater and easier solution than having to worry about external amplified speakers, batteries, or an extra power pack.

An unusual feature of the Mitsumi CD-ROM drive is the IDE interface. This allows the CD unit to be daisy-chained off the hard drive and negates the need to incorporate a costly SCSI or proprietary controller. Unlike many PCs that ship with a sound card, the Presario has the 16-bit sound engine,

based around the ESS chipset, integrated onto the motherboard. The MediaPlot Windows interface allows you to control the playback of audio CDs, midi and wave files.

If you have always wanted to have access to a fax machine but have not been able to justify the purchase, you will find the built-in communication capabilities of the Presario extremely useful. With the bundled MaxFax software you can send and receive faxes and have the PC double as an answering machine. If you intend to transfer a lot of data or take up the option of three months' Compuserve membership, free with a \$40 credit and WinCIM interface, then you will soon be wishing that the modem was capable of significantly higher transfer rates.

In keeping with the user friendly approach Compaq has reinstalled Tabworks, replacing the Program Manager in-

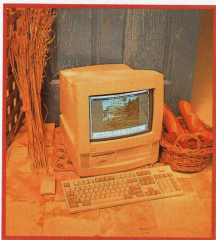
terface and Microsoft Works. Instant productivity within minutes of opening the box.

Unfortunately when you buy a consumer PC — such as the Presario — there are a number of trade-offs. These, however, are becoming less significant with each new release. For the Presario the main trade-off is memory. The 420M hard drive is more than adequate but the 4M of system RAM is now considered baseline. Upgrades to the RAM are easily accomplished with the removable chassis and two 72-pin SIMM sockets on the motherboard. The second major trade-off is in the area of expansion. Expansion for the system is limited to one serial port and two half length ISA cards, but for most this is often more than adequate. If you were looking for a vacant internal drive bay or wanted to hook up an external monitor you would be out of luck.

In our benchmark suites the S3,299 Presario CDS 520 performed admirably for a machine based around a 486SX2 processor running at 66MHz. The DOSMark score of 512 can be attributed to a healthy DOS disk score of 951 from the Conner CFS4020A hard drive. The local Video Graphics accelerator is based around the Cirrus Logic GD5424 chipset and 512K of fast VRAM, this configuration returned a Graphics WinMark of 3.78. In order to run Winstone, our applications based test, we had to bump the RAM up to 8M where the system scored 31.4 — more than powerful enough for the majority of home computing needs.

Also available is the Presario 700 range, which is identical except for the desktop case and the high performance, expandable, Presario 900 series which is housed in a mini tower case. With a three-year warranty, Compaq offers a unique and fully featured entry into consumer home computing.

Stuart Bowman



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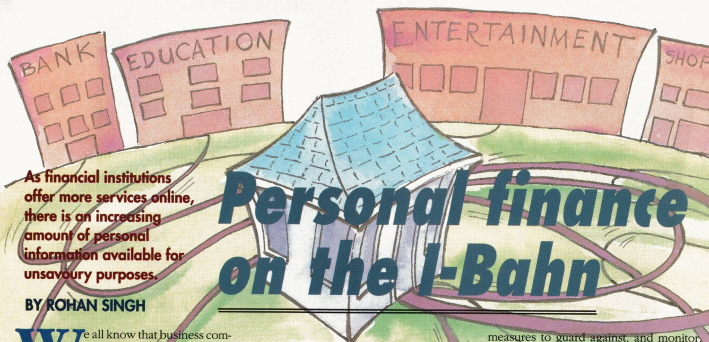


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As financial institutions offer more services online, there is an increasing amount of personal information available for unsavoury purposes.

BY ROHAN SINGH

Personal finance on the I-Bahn

We all know that business competition leads to more aggressive marketing. The sea of personal information collected in the course of business by banks and other enterprises becomes an extremely valuable resource as it indicates how and where to gun for new business.

The Report of the House of Representatives Standing Committee on Finance and Public Administration (1992) acknowledged that there has been consumer concern due to increased computerisation in financial institutions, in the areas of both record storage and the execution of transactions. As financial institutions progressively offer more services to the consumer, such as insurance, superannuation, investment advice and even travel agency services, there is an expansion in the depth and breadth of personal information collected about clients.

The collection of this data is not necessarily part of financial institutions' agendas, however; it is a by-product of the services provided. The computerisation of financial institutions means that data is in a readily manageable form and can be quickly adapted to suit various uses, all without the knowledge of the customer.

Not only financial institutions are becoming high-tech. Accountants and individuals are also turning to computers to help them manage their money.

Tim Molloy is the marketing manager of Cee Data, a company which develops software for accountants in practice. Features of Cee Data's products include applications for the preparation and lodgement of client accounting statements, tax returns, management reports and the collection of other general finan-

cial information. Financial information is received by the accountant from clients and their banks and Cee Data's software can accept data from all the popular accounting software used by businesses, including Quicken, Money and MYOB. This has led to an increasing "vertical integration of client, accountant, bank and statutory body" Mr Molloy says.

"It's not just access to money, but also access to information that is of concern," Mr Molloy claims. "Imagine accessing the complete financial information of a company before that information is released to the stock exchange."

Obviously, measures have been taken to reduce the risk of such abuse. Data is encoded during transportation between bank, or client, and accountant. Although data is now sent on disk, this will soon be performed online as banks begin to offer the service. Once data is received by the accountant, it can only be decoded by retrieving it into the correct client ledger, reducing errors in accounting practices.

Banklink is a third party organisation which collects requested details from banks and provides the information to the requesting accountants. This provides a buffer between the bank and the rest of the chain and so prevents a door opening to the entirety of the data stored by the bank. It is, however, another data collection point which is open to security breaches, both internally and externally.

As Mr Molloy says, good housekeeping is the best security measure at client level and also for banks and accountants, who should all ensure a system of checks and

measures to guard against, and monitor, any breaches of security.

Of course there are security issues at each stage of every transaction. High tech consumers should be aware that their data is not necessarily as secure as they might think, and also that the intended recipient of the data may be able to make unauthorised use of it. See "Rights and reliability" on page 118.

The software that allows personal financial transactions to take place is of vital importance. The most popular personal finance management software at the moment is Quicken, by Intuit. Quicken holds 48% of the US software market for personal finance management, well ahead of Microsoft's Money which only represents about 5%.

It's old news now that in a US\$1.5 billion dollar stock swap, Microsoft and Intuit are "merging". Snapping up Intuit clearly had advantages for Microsoft: as far as software sales go, but if Microsoft merely wanted to sell more software, it would have marketed Money even more aggressively than it has done. So what has Quicken got that Microsoft hasn't?

In the US, Quicken has 6 million users, and in Australia 60,000 users. Microsoft wants to tap into users who are happy with the software they already have. But why?

When Intuit starts offering users of Quicken features which will allow them to buy groceries and book tickets to sporting events online, Microsoft wants to make sure that it gets the transaction fee. Each time an online application is used, a fee, similar to charges for using EFTPOS, will find its way back to Microsoft. This will be a substantial kickback in addition to sales of the software package to new users.

This sort of online commerce is a little



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way off, but what is available in the personal finance management market in Australia right now is leading the world.

"Quicken is expected to control home banking in the future," claims Greg Wilkinson, managing director of Intuit (Australia). When used with Quickline (published by Reckon Software) Quicken users can now download their bank details directly from the Commonwealth Bank.

"The Commonwealth Bank was the first to move and took the initiative while the others pondered. By about April next year we expect most banks to have joined," Mr Wilkinson said. This will mean that for all the accounts you manage using Quicken, you will be able to download up-to-date balances and transaction records directly from the relevant financial institution.

"The details will be 100% accurate, or at least 100% reconcilable with bank statements," Mr Wilkinson says. And there will be no need for you to enter details of all the transactions you make. You simply download everything.

Security is an important consideration, particularly when introducing new users to an area perceived as being the playground of hackers and computer criminals. According to Mr Wilkinson: "it will be more secure than things are now because it works on the same principle as Personal Identification Numbers (PINs), and nothing has to go through the post." The course of events will be more closely analogous with using an ATM. You dial in, enter your PIN and request the details which are then down-loaded from the financial institution into Quicken.

"From a banking point of view, we know banks will look kindly on those using Quicken. They've actually said they will view positively any applications for loans where the customer manages their money with Quicken." This is because

users will be able to accurately gauge their financial position and present a calculation of their net worth in a format which financial institutions will be familiar with.

The next step for Quicken is home banking, allowing credit card, electricity and phone bills to be paid online. Then online shopping. In the US, you can get a Quicken Visa Card. Intuit (Australia) is looking closely at the progress of this move, but has no plans at this stage to follow suit. "In the US there are hundreds of banks, and Visa already had alliances with them," Mr Wilkinson says. "Here, it would be easier for us to form alliances with each Australian bank because there are only a few, kind of like a shortcut."

Intuit claims that online shopping will allow you to buy anything from groceries to tickets to sporting events. But this is the future, so you don't just book your tickets. You dial in, see who is playing whom, when and where they are playing and what seats are available. Then you pick which seats you want, how you want to pay and then wait for them to arrive in the mail while Quicken transfers the money for you.

This level of technology and service is exciting for some, intimidating for others and viewed sceptically by a few. But for those few who think it can't be done, just take a look at Citibank's banking centre in Chatswood.

David Hollott, senior general manager of Citibank Australia, described the centre as "a distribution channel which will allow Citibank to grow faster because it's cheap, efficient and allows us to centralise

we've seen that only customers with a high volume of transactions, small businesses mainly, and PC buffs have been using the service. Here, these services can all be handled by phone banking, so there's no need for PC banking. But I think that's all going to change with convergence and falling prices."

The Citibank banking centre in Chatswood allows users to do anything which may be done in a conventional bank except deposit cash or withdraw large sums of cash. "This is not a problem," Mr Hollott says, "because most of our customers have balances of around \$30,000, so they don't walk in off the street with that much cash. Cash withdrawals are available in ATM amounts."

"I say the centre allows users to do anything because you don't have to be a Citibank customer to use the centre. It's not like the ATM stations in some banks where a card is required to open the door to use the ATM. A non-customer can walk in and open an account over one of the centre's computers which allow a video conference to be held with a banker. For Citibank, this means its personnel are not scattered all over the city, and for the customer it means you always get to speak to someone at head office "face-to-face". "When people want financial advice, it's difficult to do it over the phone," Mr Hollott says.

A higher level of service is also guaranteed by adopting this structure for a bank. The people who you talk to "face to face," are Citibank bankers, not tellers. "They have to be, because they do not know



"Imagine accessing the complete financial information of a company before that information is released"

Tim Molloy, CEE DATA

operations". The banking centre is "staffed" almost entirely by computers and is open from 7.30am to 9pm. There are two human members of staff, however, who are there to assist customers in using the technology, or to use it for them if they find the technology a bit too much to cope with.

Mr Hollott is quick to point out that this is not self-service banking. "The customer does not directly access the system, the video banker does. What we do have overseas is PC banking which allows a customer to look up their account balance, order a statement or cheque book and anything reasonable without actually being able to alter balances.

"This hasn't been successful because home PCs are not user friendly enough and

whether the next customer may require a banker or just wants to open an account."

The banking centre at Chatswood is a prototype which has proven to be very successful. Plans are in place for a second centre in Sydney's CBD to open in around March 1995. The centre is unique and has sparked worldwide interest, including from the top dogs of Citibank in New York.

Security is "not a major problem," said Mr Hollott, as "there is not much cash on site". Not having direct access to the bank's computer system is an added precaution.

A further niche of online financial management is the Australian Tax Office's Electronic Lodgment Service (ELS). ELS has been expanded since its national inception in 1990 to cover all major return



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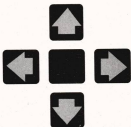


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Our right to privacy has been recognised by the laws as being one of our basic human rights, yet there is surprisingly little protection for the privacy of an individual's personal information.

BY ROHAN SINGH

Rights and reliability

The right to privacy has received protection from both the common law (judge-made law) and statute law. People should be aware however, that protection, where given, is not always as far reaching as one would like, particularly as new technology has a way of sidestepping old laws.

There is no discrete area of the common law which deals with privacy as such, but privacy can sometimes be ensured by other actions. A term in a contract may provide for privacy in some regard, and any contravention of a term is a ground to sue for breach, or anticipated breach, of the contract. The aim is to either prevent an anticipated breach or at least be awarded monetary damages.

An action for breach of confidence can also be used to protect privacy in certain circumstances. This action requires that the information is of a confidential nature, that it was told in circumstances importing confidence, that there was an unauthorised use of the information which was detrimental to the plaintiff and that the use was intentional.

This would be of little use to most individuals and is more suited to commercial information. Indeed, in a report on privacy in 1983, the Australian Law Reform Commission claimed that the common law action of a breach of confidential information was unclear and subject to too many limitations to be of any value in protecting privacy.

The banker's duty of secrecy may be of somewhat more assistance to individuals. This duty stems from the English case *Tournier v National and Provincial Union Bank of England*. *Tournier's* case is authority for the principle that there is a term implied into the contracts between banks and their customers which prohibits banks from disclosing personal details of customer's accounts. This is subject to four broad exceptions: Where disclosure is required by law, where the bank has a duty to the public to disclose, where the interests of the bank require disclosure and where the bank has the expressed or implied consent of the customer. The effectiveness of the banker's duty is obviously, and significantly, reduced by these exceptions.

The banker's duty itself only applies to deliberate disclosure to parties outside the bank by staff of banks, not building societies or other financial institutions. Negligent disclosure and disclosure to other sections of the bank do not constitute breaches of the duty.

The Commonwealth Privacy Act provides for the protection of data privacy in accordance with the OECD's (Organisation for Economic Co-operation and Development) eight precepts. Section 14 of the Act establishes 11 information privacy principles (IPP's) based on the OECD guidelines for the collection, storage and security of data, access by individuals to their personal records, the accuracy of those records, use of the information and disclosure to third parties.

Collection must be for a lawful purpose directly relating to the collector's function of collection, and may not be performed by unlawful or unfair means. The collector must inform the data subject of the purpose for collection and to whom the information is routinely given. From this last requirement, it necessarily implied that the data subject must know that information is being collected. The Privacy Commissioner is empowered by the Act to investigate any breaches of the IPP's and privacy audits are carried out on Commonwealth agencies by the Commission.

Some further protection in this area comes from the Commonwealth Telecommunications (Interception) Act, which forbids the recording of a communication transmitted by a telecommunications system, and the Commonwealth Listening Devices Act, which makes it an offence to record a private conversation, in some circumstances even when the person recording the conversation is a party to the conversation.

It should be kept in mind that the Commonwealth Privacy Act applies mainly to Commonwealth government agencies. These agencies must list their information holdings in the Personal Information Digest (a publication comparable in size to a Sydney telephone directory) which is available from the Commission through the Privacy Hotline (freecall 1800 023 985).

It does not, in general, relate to the collection of personal data by private corporations. There are, however, some provisions of the Act which relate to two other areas of privacy issues.

Firstly, tax file numbers. The Privacy Act makes it a criminal offence to collect or use tax file numbers for non-tax purposes or to not restrict access to tax file numbers. The Privacy Commission conducts privacy audits of all types of bodies who collect tax file numbers, not just government bodies.

Secondly, credit providers. There are provisions governing what sort of information can be collected by credit providers and how it may be dealt with. Credit providers may not collect lifestyle information (such as religion) about their data subjects and customers.

Although the Privacy Commission's powers are limited by the Act, it does play a role in the education of corporations as to the OECD's guidelines. While it has no legal authority to ensure compliance, it has obtained agreements from industry to ensure a degree of privacy, such as withholding information on share registers from direct marketing businesses.

In New South Wales the Privacy and Data Protection Bill of 1994 is under consideration, however, this also largely relates to government bodies. It will see the appointment of a state Privacy Commissioner, who will assist in the adoption of data protection codes based on data protection principles set out in the bill, take complaints and also monitor compliance with the bill. At the moment, the New South Wales Crimes Act makes it an offence to intentionally obtain unauthorised access to information in a computer. However, there is no offence covering the unauthorised release of information, whether stored on a computer or not.

Neither the state nor the Commonwealth Act covers privacy aspects, such as electronic mail. It seems that the present state of law in Australia is that there are no rights for the privacy of email. This is particularly relevant to the employer/employee relationship.

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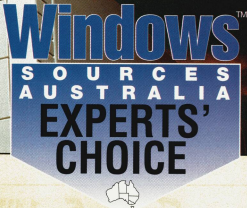
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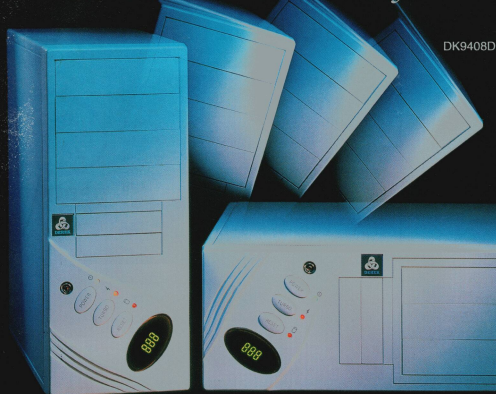
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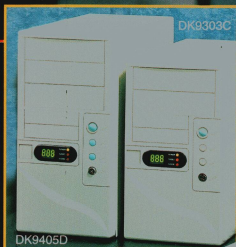
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says Sheila McGregor, communications law partner at Freehill Hollingdale & Page Solicitors. "I don't know of any case in New South Wales which deals with this."

"Employees should talk to their employers and agree on a code as to what access the employer is to have to employees' messages. I wouldn't assume that messages are private unless employees pin down the line of demarcation with employers." Apart from the fact that "it just wouldn't be good work practice" for an employer to break such a code, it is possible that a code could form part of the employment contract.

It goes without saying that it is preferable to prevent information from being seen by unauthorised eyes than to rely on a legal remedy once business or private information goes astray. The first precaution is to prevent internal security breaches. This is best achieved by good housekeeping within data storage bodies and in corporations using electronic messaging. Passwords should be kept strictly confidential as these are the only safeguards against unauthorised access to your data if someone also has access to your workstation.

From the outside, it is far more difficult for a hacker to breach the security of email and stored data. This is due largely to encryption.

Encryption is a manipulating of data by the use of a mathematical algorithm so that it can not be read by those without authorised access. There are many techniques used and companies specialise in writing encryption software. One such company is RSA Data Security which provides the security for Lotus Notes. This encrypts data at the workstation level, before it is transmitted anywhere. The technique employed by RSA requires two keys, a public key and a private key, to decrypt data.

Keys may be of various lengths, and are measured in bits. In the US, encryption software writers may write keys of any length, however the US State Department has introduced regulations which ban the export of encryption keys of more than 48 bits in length. This is for Uncle Sam's defence and is intended to maintain the best security for the United States, and only the United States, and to keep the rest of the world behind. According to Alistair Cloke, product manager for Lotus (Australia), "48-bit keys provide very, very good security". Despite this, lobbying groups are seeking the repeal of this restriction, Lotus included.

A popular key length used in RSA keys is 512 bits, and this length is used in Lotus Notes. "It would take 500,000 MIP years

to work through all the variables for a 512-bit key," said Mr Cloke. "That means it would take a one MIP processor [a 486 for example] 500,000 years, or 14 hours on an array or link of one million 300 MIP processors. This is the maximum time, but even if it only took someone half the time, it's still more than the lifetime of the average hacker." Indeed.

All anyone needs to decrypt data at your workstation is your password. From the outside, on the other hand, hackers enter at the operating system level and go straight for data files. To do this, they must either get onto the network or have physical access to the server. Once presented with the encryption algorithm, our hacker must reverse engineer it to be able to use it.

Some RSA algorithms have been published on bulletin boards. While this reduces the safety of data encrypted using those algorithms, it does not amount to an open door. "A hacker would still have to have a mechanism to work out the key size and how the algorithm is implemented in the application," assured Mr Cloke.

Encryption need not be carried out by software. In the US, there is a trend towards hardware based encryption despite the likely demise of the Clipper Chip. Applications used must recognise the security hardware available and make a call to that hardware. The encryption chip will then pass back either the encrypted or decrypted data. There were moves to adopt the Clipper as a standard for encryption in the US. "All the Clipper does," says Assistant Attorney General Jo Ann Harris (Department of Justice) "is, after a court has authorised interceptions of communications, we get the ability to understand the content of legitimately intercepted communications."

While it is argued that the Clipper gives the best level of security, it is also feared that this is just another way of big brother watching over our shoulders.

Mr Cloke says "the issue of monitoring is a matter for the legislators. We can implement measures either way. But as soon as you require a standard, and it gets published, then all the applications which use it are no longer as safe. It's a contradiction in terms."

Users of email and other data subjects should be aware that you have certain rights only and can get help, from the Privacy Commission and union, if you feel privacy in the workplace is infringed and negotiations with employers are fruitless. The bottom line with email is to not say what you don't want someone to find out about. Just like a cellular phone. ▲

forms including individual, partnership, trust, superannuation and company returns. ELS even has a mechanism for applying for a private ruling from the Commissioner of Taxation, such as on the deductibility of a certain expense.

Consumer concern has sparked moves to prevent personal information being collected by financial institutions. The Report of the House of Representatives Standing Committee on Finance and Public Administration recommended the adoption of recall protection limiting access, by a series of codes, to authorised bank staff. It also recommended that banks conduct regular audits of their security arrangements as well as staff training on privacy and security related issues. Since the codes would still be decipherable by bank staff with sufficient seniority, the information would not quite be out of reach, however.

Banks have a duty to not disclose personal details of customers' accounts, but this duty would not apply to the collection and disclosure of data such as where a customer made a purchase and what was purchased. As a credit provider however, a bank would not be permitted to collect data which did not directly relate to credit worthiness, such as lifestyle information.

There is also concern about whether the carrier of the information is listening in. Telecommunications carriers would be in a position to collect unprecedented levels of personal financial information without the knowledge of the data subject. This, whether authorised by the carrier itself or by unauthorised "tapping" would probably amount to a contravention of the Commonwealth Telecommunications (Interception) Act which covers the interception of communications passing over a telecommunications network, but not the viewing of such a communication. It goes without saying that the trade in this information for marketing purposes could be quite lucrative.

Margaret Wight is a partner at KPMG Pete Marwick in charge of computer audit and involved in the strategic planning of the EDI (Electronic Data Interchange) Council of Australia. She sees a bigger risk from the manipulation of money in transit, but by internal breaches of security and hackers.

"At the moment nobody is really doing it, but it will become a bigger issue. It's most risky when people really start using [the technology] or when they get complacent about it," says Ms Wright.

There seems to be no stopping the graduation of personal finance management onto computers with online access to the commercial and financial forum. Individuals should be aware of the potential for abuse of the personal information collected about them, and should also remain ever vigilant with respect to the security of their money and data in transit. ▲

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5th Annual Printer Issue

In this month's issue (Part 1), we find personal lasers have dropped below \$1,000, while top-end workgroup models are selling for \$3,500. In next month's Part 2, we find colour is everywhere in the printer market and everything is cheaper this time around with affordable colour inkjets and a colour laser from HP.

Over this and next month's issue, you'll see plenty of reasons why your office won't be a paperless office anytime soon. The products reviewed in *APC's* fifth annual printer issue represent new highs in affordability, speed, resolution and colour.

Last year we saw low-end laser printers sell for less than \$1,500. This year they've fallen to less than \$1,000. At the same time we're seeing 12-page-per-minute laser printers selling from around \$3,400 — the same price 8ppm printers sold for a year ago. The majority of laser printers now offer 600dpi resolution. And around half of the inkjet printers on the market now offer colour capabilities. The colour inkjets have been joined by three colour laser printers, including the much-anticipated Hewlett-Packard model.

The market for impact printers will shrink this year to 221,000, down from 253,000 units in 1993 — a market share loss of 12.6%. This continues the slide as shown from the 1992/93 figures, where sales dropped from 273,000 in 1992 down to 253,000 for 1993 — a 7.4% drop.

In addition, despite this downward trend, impact printers still account for most printer sales in Australia. Total printer sales are expected to be worth \$570 million for 1994 compared to \$558 million in 1993, with impact printers' projected share of 221,000 unit sales outdoing the mono inkjets' projected 179,000 units and laser printers' 127,000 units. Colour inkjet sales are expected to reach 30,000 units this year.

As a whole, the printer market will grow by 5.25% this year, according to IDC, including a 13.4% increase in laser printer sales and a 27% increase in inkjet sales.

Trends: Colour everywhere

Two trends really stand out this year. Probably the more visceral of the two is the near-universal access to colour. A year ago, the colour inkjet printer was an

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OVER THREE MILLION
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Neo One GOL 03/APC

How we tested the printers

The printers reviewed in this round-up (covered over the December 1994 and January 1995 issues) were subjected to a battery of more than a dozen tests measuring text and graphics speed, compatibility, print quality, colour fidelity, and power consumption.

Test environment

PC Labs ran all tests on a Compaq Deskpro 486/33M with 8M of RAM and a 310M hard disk. For our Windows applications tests, we installed Microsoft Windows 3.1 in its default configuration. To get the most consistent results, we turned off virtual memory and bypassed the Print Manager. We ran all print-quality tests at each unit's highest resolution, with any resolution-enhancement or smoothing feature turned on.

Network speed test

This measures a network printer's ability to handle multiple simultaneous print jobs. We sent each printer an alternating load of 725K PCL and 3.7M PostScript print jobs across a network, sending a total of three jobs each. We performed this test on departmental lasers only.

Power consumption

We measured power consumption when printing, when idle, and in powersaver

sleep mode for all laser and high-end colour printers. The US EPA Energy Star program calls for laser printers to use less than 30 watts in sleep mode (or less than 45 watts for colour printers and printers faster than 15ppm).

Harvard graphics colour quality test

This test measures each printer's ability to reproduce a business chart. We created the chart in Software Publishing Corp's Harvard Graphics for Windows. We ran it only on colour printers.

Graphics Speed and CorelDRAW tests

For the CorelDRAW test, we timed each printer as it produced a page from the application using the supplied Microsoft Windows driver. For the Graphics Speed test, we timed each printer as it produced the page from a print file sent directly from DOS. This page helped us determine both com-

patibility and output quality. We looked at each printer's abilities to reproduce clear details in the halftone image and consistent line weights in the headline rules rotated in 10-degree increments. We also looked at the quality in the star/square image and horizontal and vertical greyscales.

Text Speed and Word for Windows tests

For the Text Speed test, we used a two-page, single-font business letter printed from DOS. Unvarying since our first printer issue, it measures raw printer-engine speed. The Word for Windows test document is a 10-page multifont test that measures text-printing under Windows. It uses multiple Arial and Times New Roman fonts. To reduce the performance lag induced in producing the first page with laser printers, we printed the Text Speed test's business letter 10 times and the Word for Windows document five times. We did not run these tests on high-end colour printers.

Photoshop Colour Quality Test

This test measures each printer's ability to render faithfully a colour photograph or halftone. We prepared the scanned image in Adobe Photoshop and ran it only on colour laser, inkjet and high-end colour printers.

How to read the printer guides

The printer guides summarise each printer's features and key test results. A band across the top of each guide includes the printer name. We ran our graphics tests at each printer's

highest resolution. For all performance tests, higher numbers indicate faster printing performance. Below is a sample printer guide.

Test results are reported in pages per minute (ppm), graphics pages per minute (gpm), characters per second (cps), or lines per minute (lpm) — depending on the test and printer technology. We report the results of our speed tests for laser printers at 300dpi to simplify comparisons among printers. Speed results for inkjet and dot matrix printers are reported for both draft and letter-quality modes. For dual-mode laser printers, we report results in both PCL and PostScript emulations.

Graphics output shows how each printer reproduces photographs, or

halftones. The samples are reproduced at the same size they were created.

Apple LaserWriter Select 360

10-ppm laser printer (Fuji Xerox P1 engine) with 600-dpi output, Adobe PostScript Level 2, PCL 5

PCL Text Speed: 7.2 gpm
PCL Graphics Speed: 2.2 gpm
PS Text Speed: 9.4 gpm
PS Graphics Speed: 1.0 gpm
PCL WINDOWS APPLICATIONS:
Word for Windows: 2.6 gpm
Lotus 1-2-3 for Windows: 2.0 gpm
CorelDRAW: 1.7 gpm
PS WINDOWS APPLICATIONS:
Word for Windows: 7.8 gpm
Lotus 1-2-3 for Windows: 2.0 gpm
CorelDRAW: 1.1 gpm



Remember that ti

Reme

Line art shows how well each printer reproduces lines and curves. The samples are reproduced at the same size at which they were created. Look especially for no jadedness on the curve.

Text output shows the quality of a serif font reproduced at the same size and enlarged five times.

Greyscale or colour output comprises a gradation of shades of grey or size colours (for colour printers).

anomaly. This year, around half of the inkjet printers we looked at are colour-capable. You'll generally find three levels of mainstream inkjet printers: a monochrome-only unit for \$400 to \$600; a three-colour version for around \$600 to \$800; and a four-colour version for about \$1000 and \$1300 (all *street* or selling prices).

High-quality colour printing is done with four colours, cyan (pale blue), magenta, yellow, and black; it's called CMYK in the printing industry. A four-colour model lets you print black text with black ink; it also gives added vibrancy to colour. Three-colour printers, by contrast, use just cyan, magenta, and yellow. Colours tend to be less deep and black text and objects (printed using a composite of

Evolutionary changes include the continual reduction of printing costs (as little as three cents a page in some cases), higher resolution, and better colour fidelity. The best inkjets, printing on good coated stock, now produce colour output with passable flesh tones—passable meaning you won't be embarrassed but you also won't mistake it for a photograph.

Trends: Affordable lasers

The second major trend is the continual price reduction for laser printers. About five years ago it became apparent that laser printers might reach a \$2000 selling price, but virtually no one thought it possible that we would see a sub-\$1000 laser. In fact, Brother has brought out a 6ppm printer, the HL-631, with a retail price of \$999. C-Tech's C.Itoh CI-44 Little Laser sells for \$799 and Panasonic's SideWriter KX-P4400 retails on the street for \$899. The are also a number of new laser printer releases coming to market at the moment that meet the below-\$1000 price tag which weren't available in time for testing (see the Personal/workgroup laser section, this issue).

Vendors do have to make trade-offs to reach sub-\$1000 selling prices. You may, for instance, wind up with only 512K of memory, usually not enough to image a large graphics file. Unless you print only a handful of pages each week, cost of supplies is a factor, too, and the sheer volume of the major sellers (HP, Apple, Okidata, Epson, Lexmark) means you will find their replacement toner cartridges competitively priced. At the high end of the low end, the standard of comparison remains the now-aging HP LaserJet 4L, which continues to sell everywhere for about \$1435.

Laser printer prices are effectively coming down even more because of the dominance of TrueType, Microsoft's scalable font technology built into Windows. For most users, TrueType is a good-enough solution. Adobe PostScript is better and a must-have for graphic artists and desktop publishers, but it costs more than a PCL (LaserJet-compatible) printer that uses TrueType.

Review criteria

Each year, APC devotes space in the December and January issues to the results of hands-on testing of all new printers that reached the market in the past year. To be reviewed here, printers had to be new (not previously reviewed) and shipping around

September 1994. Printers that could not make test deadlines are cited in the introduction to each review section.

To reflect the changing marketplace, here's how we organised our review sections this year:

- Personal and workgroup laser printers. Throughout this issue, when we say *laser printers*, we mean any page-printing technology, whether laser LED, or other 'laser-like' technology. *Personal printers* are the low-cost 4 to 6ppm lasers destined for standalone (not networked) use on individual desktops. *Workgroup printers* are faster, typically with speeds of 8 to 12ppm, that can be used as standalone printers or networked for use with a small workgroup. If the vendor sells an integrated (built-in) network attachment, PC Labs requested that as well and ran an abbreviated set of network tests.

- Departmental laser printers. These are laser printers with engine speeds above 12ppm that were designed from the outset as network printers. They have integrated network attachments and considerable attention has been paid to their setup and remote administration. Many offer A3 printing, as well as offering a duplexing option (printing on both sides of a page), which is an effective way to reduce printing costs.

- Inkjet printers. A year ago colour was an interesting attribute of one or two inkjet printers. Now many have colour capability.

- High-end colour printers. These are dedicated colour printers using specialised technologies: Thermal wax transfer, thermal dye transfer, and solid ink. These are aimed at corporations that need at least one printer to produce high-quality colour graphics inhouse, as well as specialised markets such as prepress and engineering shops.

- Dot matrix and line printers. Dot matrix really comprises two polar-opposite subgroups: low-cost personal dot matrix printers and heavy-duty printers for mailing labels and multipart business forms.

As in years past, reviews are arranged alphabetically by vendor name. When the vendor offers two or more printers in a category, they appear together in a single review. In cases where two or more vendors market essentially the same product, PC Labs tests the products individually, and we publish a joint review highlighting similarities and differences. ▲

Australian printer market

Units shipped	1992	1993	1994*
Impact	273	253	221
Inkjet	92	164	209
Laser	91	112	127
Other	8	4	4
Total	464	533	561
* Projected			Source: IDC

the three colours) tend to have a dull, greenish tinge. The three-colour models do let you substitute a single black cartridge when you're printing text-only documents.

Three-colour inkjets are okay if your printing tasks fall into all-colour jobs (overhead transparencies, flip charts) and all-monochrome jobs (memos). If you want to mix text and colour graphics, spend the extra money for the four-colour printer. Some monochrome-only inkjet printers can be upgraded to three-colour operation with a colour-upgrade kit, but three-colour printers can't be upgraded to four-colour.

HP, Canon (along with Apple, using Canon components), and Epson are the major inkjet vendors, and they are immensely protective of their market share. HP notes with pride that its inkjet printer division is a \$US3 billion-a-year business. And we're likely to see one more major player next year with Panasonic's belated arrival.

In addition to these standard printers, there are a number of specialty inkjets. Epson and Canon, for example, market tabloid-size printers. HP's Deskjet 1200C and 1200C/PS match laser printers on speed and deliver excellent colour to boot. Several vendors offer stylish portable printers that make great short-memo printers when used in the office.

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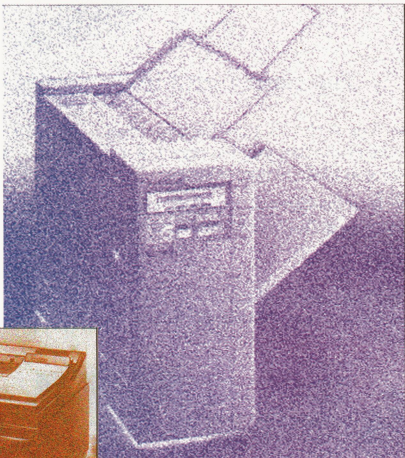
Rich

The sub-\$1000 personal laser printer has arrived, and midprice laser printers offer more features and better output than ever before.

Laser is clearly the technology of choice for business printing. It's quiet, clean, and cost-effective, and its monochrome output is the best of any existing desktop-printing technology. And the good news is that when it comes to price, resolution, network support, and even colour, you now have more choices than before. Whether you need a budget-priced desktop printer for letters, a 600dpi PostScript printer for desktop publishing, or a fast, versatile laser to share with a workgroup, you'll find a laser printer in this section that fills the bill.

Last year, we divided laser printer coverage into two sections: personal lasers, which we defined as having engine speeds of under 12 pages per minute; and network lasers, which we defined as having engine speeds of 12ppm or higher. This year we recognise that many laser printers ranging in speed from 8ppm to 12ppm are shared by small workgroups, so we've added some network testing for those printers and divided laser coverage into two new sections: personal and workgroup lasers, with engine speeds up to and including 12ppm, and departmental lasers, with engine speeds higher than 12ppm. Departmental lasers, along with inkjet, high-end colour and dot matrix will be covered in the January 1995 issue of *APC*.

Workgroup lasers tend to have engine speeds ranging from 8ppm to 12ppm and tend to be shared by five to 15 users. Many offer internal network con-





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Testing:	50° C, dynamic system level burn-in		
OS:	MS DOS, Windows, Windows NT, OS/2, Novell, UNIX and XENIX		
Support:	Made in USA, with design level technical support and service available		
Performance:	Landmark	v2.00	575.77
	Powermeter	v1.7	63.9
	Norton SI	v4.5	202.2
	Winbench	v3.11	75

\$625 ex tax (without CPU)



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VESA:	2 buffer-enhanced VESA bus master slots		
ISA:	5 16-bit standard AT slots		
Cache:	64-bit wide data bus, supports 512Kb or 256Kb 2nd cache in either WB or WT mode		
DRAM:	64-bit wide data bus, supports up to 128Mb on-board memory with 72-pin SIMM module		
Green:	User-programmable Power Saving mode, provides CPU/System board power down and Monitor/Peripheral power saving functions		
Testing:	50° C, dynamic system level burn-in		
OS:	MS DOS, Windows, Windows NT, OS/2, Novell, UNIX and XENIX		
Support:	Made in USA, with design level technical support and service available		
Performance:	Landmark	v2.00	385
	Powermeter	v1.7	44.8
	Norton SI	v4.5	142.1
	Winbench	v3.11	72

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nections and some remote management software. If we received a printer for which the vendor offered an optional network interface card, we connected the printer to our network and tested any network utilities that were included.

Review criteria

To be in this roundup, a printer had to print up to and including 12ppm using laser or LED technology, had to have not been reviewed in any previous printer blockbuster, and had to be available by September 1994. We also brought back the Editor's Choices from last year's printer issue — the Okidata OL400e, the TI microWriter, the HP LaserJet 4L and 4P, and the TI microLaser Pro 600 — to see how they would fare against this year's entries.

We received 31 printers from 15 vendors. The following printers did not arrive in time for testing: Brother's 600dpi HL-660; Epson's new entry-level EPL 3000 which sells on the street for under \$1000; Lexmark's \$999 WinWriter 200 and ValueWriter 600 (\$1643); DEC's 12ppm 3500 (from \$3371); Xerox's A3 600dpi AP8 (\$3995); and NEC's new Silentwriters.

Also not tested but deserving a special mention are 8ppm laser printers from Dataproducts. The 600dpi LZR 855-1PP, which retails for \$2295, offers PCL 5 and the company's PhoenixPage PostScript language emulation as well 5M of RAM. The 600dpi LZR 888 is a GDI printer that includes PCL 5e and Phototone, the company's half-tone screening process to enhance resolution. The LZR 888 costs \$2122, while a network upgrade for the printer takes the price to \$3130.

Testing

The products that were tested for this review were submitted to our Text Speed and Graphics Speed tests, as well as our

of 10ppm in PCL and a score of 9.8ppm in PostScript. On our CorelDRAW test, the QMS 1060 Print System led the pack, with a score of 2.0ppm in PCL and 1.6ppm in PostScript.

Extras now standard

The major trend in personal and workgroup lasers continues to be more features for less money. The HP LaserJet 4 Plus raised the bar this year by offering 12ppm performance at a price of \$3,472 — the same price as its predecessor, the HP LaserJet 4, which printed at only 8ppm. At press time, Lexmark lowered the price of its 12ppm, the 4039 12R Plus, to \$3,426. For entry-level users, we reviewed three laser printers — the Brother HL-631 (Editor's Choice winner), the C. Itoh CI-44 Little Laser, and the Panasonic SideWriter KX-P4400 — that have spectacularly low retail prices of \$999, \$799 and \$999 respectively.

Perhaps most impressive is the fact that even though prices continue to fall, what used to be extras are now standard features. Of the 31 printers in this roundup, 24 offer PCL 5 support or better, at prices as low as \$1,295 (for the Canon LBP-4i). And 17 come as standard with PostScript, 12 of them with the more capable and faster PostScript Level 2. While half of the printers reviewed this year offer only 300dpi resolution, the other half offer 600dpi resolution or better. The TI microLaser 600 offers 600dpi PostScript Level 2 for under \$2,000.

You'll also find other standard features that used to be less common. Simultaneously active ports, bidirectional parallel ports, and automatic emulation switching make it easier than ever to set up a printer and get print jobs done quickly; all are included with the majority of these printers. All but seven printers have controllers driven by RISC processors for added graphics performance, including

Laser, Canon LBP-4i, HP LaserJet 4L, HP LaserJet 4P, and Lexmark LaserPrinter 4037 5E have extremely aggressive sleep modes, dropping power consumption to less than 10 watts — about the amount consumed by a typical night light. These printers are meant to be left on all the time; the Canon LBP-4i and LaserJet 4L don't even have power switches.

Sharing the wealth

In recognition of the fact that the faster printers in this group are being pressed into workgroup service, manufacturers are paying more attention to how you hook up these printers to networks. Seventeen of these laser printers either come with or offer internal network interface cards as options, obviating the need to dedicate a PC as a print server.

The best workgroup printers, such as those from HP, Lexmark and Xerox, have software that installs quickly and easily, configures NetWare to recognise the printer, and takes advantage of bidirectional communications so the printer can tell you when it has a paper jam or is out of toner, and so you can reconfigure the printer from your keyboard. At the other end of the spectrum, the DEC Laser 5100 leaves you at the mercy of Novell's PCONSOLE for installation. While none of the printers in this section caused us serious installation problems, we have had experiences with network printers whose installation instructions are so arcane and whose installation procedures are so obtuse that they can confound a pair of network experts and take a full day or more to get running correctly.

Different strokes

Perhaps the biggest news in lasers is the advent of colour. There are three printers in this new category: the HP Color LaserJet, QMS magicolor, and Xerox 4900 Color Laser Printer. The 10ppm (2ppm in colour), 300dpi, PCL-based HP Color LaserJet is the least expensive, with a price of \$13,520. Xerox's 12ppm (3ppm in colour) 4900 offers 300dpi PostScript for \$15,170, and 1200 by 300dpi colour PostScript after an upgrade. At the high end, the 8ppm (2ppm in colour) QMS magicolor gives you 600dpi colour for \$26,614 in PCL or PostScript.

The HP's 300dpi output lacks the quality of the higher resolution output offered by the other two printers, but it is perfectly acceptable for the average business user. The Xerox and QMS colour lasers produce excellent output, rivaling or surpassing the best thermal wax transfer printers. And colour lasers are faster (and often quieter) than thermal wax transfer

Simultaneously active ports, bidirectional parallel ports, and automatic emulation switching make it easier than ever to set up a printer and get print jobs done quickly

Windows applications tests, which gauge a printer's real-world performance running popular Windows applications.

The leader in terms of raw speed was the 12ppm TI microLaser Power Pro, which came in first on our Text Speed test (with a score of 12.1ppm) and on our Graphics Speed test in both PCL and PostScript modes (with scores of 4.4 graphics pages per minute and 1.7ppm, respectively). In Word for Windows, the HP LaserJet 4M Plus led the pack with a score

the \$1,390 Okidata OL400e. And enhanced-resolution tricks that can smooth the rough edges from line art have become the norm, found in 21 of these 31 printers.

Another important change is that many of the printers in this group have been built to meet the US Environmental Protection Agency's standards for Energy Star compliance; that means they have a sleep mode that drops power consumption to less than 30 watts (less than 45 watts for colour lasers). The C. Itoh CI-44 Little

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printers. Per-page costs of colour output vary considerably. At around five per cent of page coverage each for cyan, magenta, yellow, and black, the HP comes in at 16 cents, the QMS at 30 cents, and the Xerox at 37 cents per page.

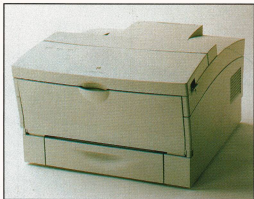
In addition, there are new printers designed specifically for Microsoft Windows users. These are called GDI printers, and they print directly from Windows' Graphics Device Interface — the graphics language Windows uses to provide output to the screen and other devices — skipping the usual translation to PostScript or PCL. Some GDI printers, such as the C. Itoh CI-44 Little Laser, come without a processor and place the workload on the computer system's CPU. Others, such as the Lexmark WinWriter 600 (and new WinWriter 200), share the load with the system CPU. The WinWriter 600 is also one of the first printers to incorporate Microsoft At Work (MAW) technology to provide software control of the printer from your PC. In most cases, you can use a GDI printer to print from a DOS application as long as you're printing from a DOS window under Windows. DOS output from the GDI-based C. Itoh CI-44 Little Laser, however, was of lower quality than Windows output.

Four printers offer duplexing — the ability to print on both sides of a sheet of paper without user intervention — as an option, making it easier and cheaper to print long reports.

Whatever your needs, laser printers are cheaper, better, and more feature-rich than ever before.

Apple LaserWriter Select 360

The Apple LaserWriter Select 360 provides an acceptable combination of speed (10 pages per minute), 600-dot-per-inch print quality (300dpi in PCL 5), and a competitive price (\$2795 recommended retail) for workgroup printing, although it does not accommodate an interface card for typical PC networks. Despite its Apple logo, the



Personal printers:

- **Brother HL-631**

Workgroup printers:

- **Hewlett-Packard HP LaserJet 4 Plus**
- **Hewlett-Packard HP LaserJet 4M Plus**

Prices of personal and workgroup printers have dropped, putting laser-quality output within reach of individuals who would have otherwise opted for inkjet or dot matrix printers, and allowing corporate buyers to install more shared units for small groups of users. In this roundup of 31 printers, we didn't find a single one that we would not recommend.

The day of the sub-\$1,000 laser printer has arrived, and we particularly liked the new Brother HL-631. Retailing for \$999, the HL-631 offers everything a SOHO user could want: Low price, reliable paper handling, decent speed (rated at 6 pages per minute), a small footprint, and sharp text output. Graphics printed by this 300dpi unit tended to be too dark, but for individuals who want affordable laser-quality text, the HL-631 is a good choice. Another machine in this class — the Panasonic SideWriter KXP4400 — merits an honourable mention. The minitower design makes the Panasonic ideal where desk real estate is of primary concern, and you can find this unit for \$899. Our one complaint: The unit choked on envelopes during testing.

As for the perennial sales leader, Hewlett-Packard offers the 300dpi HP LaserJet 4L and the 600dpi HP LaserJet 4P — still

excellent printers though not as price-competitive now as they were last year when we picked them as Editors' Choices.

For corporate workgroup environments where output quality is most important, look to the HP LaserJet 4 Plus (\$3,472) and HP LaserJet 4M Plus (\$4,336). The LaserJet 4 Plus is ideal for PCL environments, while the LaserJet 4M Plus includes Adobe PostScript Level 2, more memory, and built-in network cards. Both printers offer outstanding 600dpi text and graphics output and are among the fastest workgroup units we tested. You also get HP's superb network installation and remote management utilities.

Colour laser technology is still coming of age, and none of the three colour units we examined stood out as a price/performance leader. The best colour output was produced by the QMS magicolor, which delivers 600 by 600dpi resolution and PostScript Level 2, but you'll have to spend \$23,000 on the printer. Next in colour quality was the Xerox 4900 Color LaserPrinter (\$15,170). A RAM upgrade delivers throughput of 300dpi printing, though per-page cost is notably higher than that of the other colour laser printers. The HP Color LaserJet is the most affordable of the trio (\$13,520), but its 300dpi, PCL-only output is suitable primarily for business users.

LaserWriter comes with a parallel port with bidirectional and ECP support and is compatible with DOS and Windows applications.

Ease of use has always been Apple's strong suit, and the LaserWriter is no exception. An easy-to-use Windows-based utility installed along with the printer driver allows the user to configure all features including the 250-sheet paper tray and power-saver function. No comparable utility is available for DOS.

The LaserWriter has no front control panel — not even a button to hit in case of a printer jam. No jams occurred during testing, however, and automatic emulation and port switching worked flawlessly.

In 300dpi PostScript, this unit produced text at 9.4ppm — close to

its rated speed — but performance in PCL 5 dropped to 7.2ppm. PostScript graphics scores under DOS and Windows were slightly below average, with 0.8 graphics pages per minute on our Graphics Speed test (600dpi) and 1.1ppm on our CorelDRAW test (600dpi). PostScript images were bold and well detailed. The greys showed little banding, and diagonal hairlines showed only slight stair-stepping. Text characters were dark and well defined, though the bottom of some very fine text did drop out.

The LaserWriter comes with 7M of RAM (expandable to 16M). Options include 250-sheet feeder (\$225) and 500-sheet feeder (\$425). Apple Australia supplies a 12-month return-to-base warranty with this LaserWriter. Contact Apple on 008 025 355.

Bill Dyszel

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Resolution game: What's in a dot?

As you read the reviews in this section (and in the network laser section to be published next month), you will find a wide range of claimed resolutions: 300-dots-per-inch, 300dpi by 600dpi, 600dpi, 1200dpi by 1200dpi, 1200dpi and others. What exactly is resolution, and how do different laser printer vendors define their ratings?

To understand resolution, it's necessary to understand how a printer places dots on the page. A diode laser projects its light against a spinning mirror, which flashes the light at a rotating drum. The drum is coated with a photosensitive layer that changes its electrical charge at the point where it is struck by the laser's light. Toner adheres electrostatically to the charged area of the drum and is then fused to the paper.

A printer's engine resolution is determined by two factors. First, the speed at which the mirror can spin and the speed at which the laser can turn on and off determine how many dots can be drawn in a single line across the drum. Second, the degree of rotation of the drum determines the number of scan lines that can be drawn for each inch of the drum's surface.

Most laser engines are designed to produce 300 by 300dpi output (300 dots in a single line and 300 scan lines per inch) or 600 by 600dpi output. Most laser printers today, however, use clever tricks to manipulate the size and placement of certain dots. By shortening the pulse of the laser beam, the amount of light hitting the drum can be reduced, resulting in a smaller area where the charge is altered sufficiently to attract toner; thus, a smaller dot. By causing the laser to fire slightly early or slightly late, the position of the dot can be altered horizontally.

A printer that skillfully manipulates dot size and position can fill in jagged steps between standard-size dots with smaller dots. This reduces the jagged appearance of diagonal lines and curves used in text

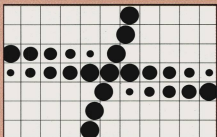
and line art, yielding output that can look almost as good as output from engines with resolutions that are two to five times as high. Hewlett-Packard performs tricks like these with most printers in its LaserJet series and describes these units as offering 600 by 600dpi with Resolution Enhancement Technology (RET).

Some printers take this a step further; instead of filling in spaces between large dots with smaller dots, they actually manipulate the laser to address 1200 horizontal dot positions with a 300 or 600dpi engine. Xerox calls this feature



small areas to accept or reject the toner from the tiny areas required for high resolution. And the toner itself must be made of sufficiently fine particles so that they adhere to only those parts of the drum they are supposed to yet still transfer reliably to the sheet of paper as it passes the drum.

Manufacturers do not always specify these other aspects of their products' capabilities. You will often see ratings that cite 'effective resolution', which typically includes the effects of some resolution-enhancement techniques. Note also that standard enhancement techniques often



Shown above is a graphical depiction of dots of toner forming two intersecting lines, one nearly vertical, the other nearly horizontal. The graphic on the right shows the output from a printer with enhanced resolution: The stair-step effect resulting from the bigger dots filled in with smaller dots. Vertical dots have been repositioned slightly. The graphic on the left depicts the same lines without resolution enhancement.

addressability and claims 1200 by 300dpi resolution for its Xerox 4900 Colour Laser Printer.

Another common practice is slowing the drum's rotation speed so that the number of scan lines can be doubled vertically. This is a practice commonly used in printers that claim 1200 by 1200dpi (also called simply 1200dpi) resolution.

Don't assume, however, that a printer claiming 1200dpi resolution will produce output that is superior to that of a 600dpi printer. The electronics in the controller must be able to handle more data per second in order to pulse the laser faster. The drum must be able to hold its charge in sufficiently

have a detrimental effect on images with different levels of grey tones, such as scanned photographs.

The engine resolution is a more reliable indication of how many dots per inch the printer can produce in the horizontal and vertical dimensions, and resolution enhancement techniques will then improve on those specifications.

Ultimately, the best means of identifying effective resolution remains the user's own eye — though a loupe or other magnifier can be a valuable aid in the process. When it comes to laser printer resolution, seeing is believing.

Alfred Poor

Brother HL-631

The under-\$1,000 laser printer is here. Brother's 6ppm Brother HL-631, an Editors' Choice selection, is the perfect choice for individual and small office/home office users who need 300dpi laser printing at a low cost. Brother says the printer retails for \$999, with current street prices coming in marginally less.

Despite the low price, the Brother printer scored well on graphics tests, particularly since the unit tested included only 512K of RAM, instead of the standard 1M of RAM that comes with the printer. The unit posted a speed of 2.6 graphics pages per minute on the Graphics Speed test and 1.8ppm on our CorelDRAW test. The graphics output did have some dark, unfocused images, and greyscale bars lacked distinction among the grey shades. Text

printing was clear and sharp, and it seemed to be the printer's strong point.

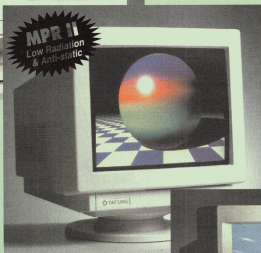
Installing the 17,000-page drum and the 3000-page toner was a little cumbersome, but the use of two separate pieces reduces replacement costs. The 200-sheet, multipurpose sheet feeder (also slightly tricky to install) handles up to and including No. 10 envelopes, or heavy card stock. The feeder gets installed in the top of the printer to create a straight

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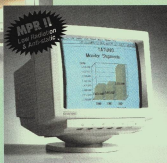


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paper path, thus minimising misfeeds and jams, and eliminating annoying paper curls. Envelopes fed through and printed with no problems during testing. The 33 by 35.5cm footprint allows the printer to fit in congested areas, but you'll need another 13cm to open the front output tray.

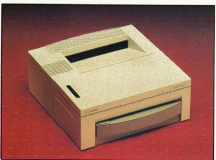
The HL-631 comes with a Windows driver that gives you the option to install any of the 24 bitmapped fonts or 21 TrueType-compatible fonts. The printer allows you to reprint the last page printed by hitting front-panel buttons. The HL-631 comes with a 12-month return-to-base warranty.

Brother has a new printer on the way that should be available this month — the 600dpi HL-660 with 2M of RAM, PCL 5e and optional PostScript. It is expected to include BookMaker Corp's clickbook software for producing handy booklets, in addition to a sample packet of various speciality papers. For more information contact Brother on (02) 887 4344.

Margaret Piemonte

Canon LBP-4i

The buzzword is SOHO (small office/home office); the 4ppm 300dpi Canon LBP-4i (\$1,295 recommended retail) aims squarely at this target market. The printer delivers quality performance in an easy-to-use package, however, the Canon unit falls



a little short in the price/performance ratio to stand out in its respective crowd.

Dependability has been the hallmark of Canon laser printer engines, and this model sticks to the previously successful formula of one-piece toner/developer/drum cartridges, making the replacement of consumables as easy as possible.

The most striking feature of the LBP-4i is the simplicity of its design. There's not even a power switch; the US Energy Star-compliant design draws so little power in idle mode (powering down to just four watts) that there is no need to turn the printer off. The LBP-4i's windowless control panel consists of a single button that controls a host of functions depending on the state of the printer. Certain configuration changes, such as choosing manual paper feed or number of copies, are left to DOS and Windows utilities. With crisp type and smooth greyscaling for a 300dpi printer, image quality is on a par with that of the HP LaserJet IIIp, which it emulates (PCL 5).

Canon includes a 12-month return-to-base warranty with the LBP-4i. The company can be reached on (02) 805 2000.

Alfred Poor

C. Itoh CI-44 Little Laser

The very low-priced \$799 C. Itoh CI-44 Little Laser is the cheapest laser in this round-up and is a typical GDI printer: An economical choice for the Windows user who seldom uses a non-Windows application. Unlike the company's soon-to-be-released RISC-driven CI-8Xs, the 300dpi CI-44 has no processor; it depends entirely on the host PC.

The 4ppm machine turned out Windows text at a slow 2.7ppm, and it produced Windows graphics at 1.7ppm. Bundled rasteriser software for PCL 4 makes DOS printing possible but not practical. Output slows to a crawl, and we observed print to be faint and spotty.

While the unit's relatively small footprint (35.8 by 28.7cm) and light weight (5kg) are welcome, its overall design is flimsy. An inbuilt door tended to flop open, cancelling our print jobs. On the plus side, blacks were solid and jagged edges were slight in our Windows print-outs, thanks to the driver's proprietary Edge Enhancement Technology. The printer control utility for Windows offers highly detailed real-time printer status reports in an easy-to-understand graphic format, and a dialogue box pops up immediately to report any printing errors as they occur.

Overall, this is not a printer that can take knocks, however it may fit the bill if you're

after a low-cost personal printer for the edge of your desk, and you don't feel that print speed will be an issue.

Anitech in Sydney sells the full range of C. Itoh printers in Australia; however the product is also available from outlets such as Harvey Norman — which bundles a 36-month return-to-base warranty on the CI-44 Little Laser.

Anitech also plans to release three new printers to Australia in early 1995. C-Tech Electronics' C. Itoh ProWriter CI-9Xtra, C. Itoh ProWriter CI-8Xtra+, and C. Itoh ProWriter CI-8XA, which are all based on 8ppm TEC 1323 engines, come with GDI drivers. But unlike most GDI printers, the upcoming C-Tech units have their own AMD 29200 RISC processors and support other emulations. The role of GDI here is not to make possible a stripped-down, Windows-only printer but to simulate 600dpi printing by controlling laser intensity via C-Tech's XWIN utility. PCL 5 at 300dpi is also standard on all three models.

The CI-8Xtra+ and CI-8XA add a proprietary version of Adobe PostScript Level 2, which can also print at 600dpi (not with C-Tech's DOS PostScript driver, however). The CI-8XA adds an AppleTalk port. No optional network interface is offered.

Anitech can be reached on (02) 749 1244.

Bill Dyszel

DEClaser 1800

DEClaser 5100

With its plentiful supply of fonts and long list of options, Digital's 8ppm, 600dpi DEClaser 5100 (retail price \$3,194) is almost a winner. Unfortunately, poor emulation switching limits this model to less demanding workgroup printing environments. Retailing for \$1,651, the 6ppm DEClaser 1800 is an inexpensive personal printer with average-looking 300dpi output.

A solid performer on our benchmark tests, the Canon LBP-EX-based DEClaser 5100 hovered just above its rated 8ppm speed in PCL 5e and dipped just below it in PostScript. Graphics performance at 600dpi was slightly above average, with 1.1 graphics pages per minute on the Graphics Speed test and 1.2ppm on the Windows-based CorelDRAW test. Output quality was fine with crisp text and slight banding in greyscale graphics. The 5100's resident font collection is huge — 44 faces in PCL, 76 in Adobe. Options include memory expansion to 66M using standard SIMMs, an Ethernet card (\$783), plus a 500-sheet paper tray and an envelope feeder. A \$697 1200dpi upgrade, as well as 128M hard disk option,



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Benchmark tests: Personal/workgroup lasers

The fastest personal/workgroup laser of the pack was the TI microlaser Power Pro, which ran slightly faster than its rated engine speed of 12 pages per minute on our Text Speed test, turning in a score of 12.1 ppm in both the PCL and PostScript emulations. In fact, the TI printer was a leader across the board, with a Graphics speed test score of 4.4 graphics pages per minute in PCL mode and 1.7ppm in PostScript mode.

What the numbers mean

The Lexmark WinWriter 600 exceeded its rated engine speed of 8ppm by 1ppm on our Text Speed test [in PCL mode] — a fairly remarkable result and a testament to the Lexmark 4029 laser engine design. Equally impressive was the Sharp JX9460PS, whose 6ppm sharp 9640 engine yielded 6.7ppm in PostScript test.

The TI microlaser Pro 600 PS23 had

relatively poor PCL Text Speed test results of 3.6ppm, but excelled in PostScript test, printing at 8.1ppm. This is attributable to the fact that the microlaser Pro 600 is primarily a PostScript printer and converts incoming PCL print jobs into PostScript before printing them.

The three colour lasers, the HP Color LaserJet, the QMS magicolor, and the Xerox 4900 Color Laser Printer, were relatively slow at printing monochrome text when compared with printers of the same engine speed. The magicolor, printing at 6.8ppm and 6.6ppm in PCL and PostScript monochrome text, respectively, was the second-slowest of the laser printers rated at 8ppm. The Color LaserJet's PCL Text Speed test score of 8.6ppm was the second-slowest of the laser printers rated at 10ppm, and the 4900's PCL and PostScript Text Speed test scores of 8.2ppm and 7.1ppm, respectively, were at the bottom of the 12ppm-engine category.

On our Microsoft Windows applications tests — Word for Windows, Lotus 1-2-3, and CorelDRAW — the fastest workgroup printers were the HP LaserJet 4 Plus and the HP LaserJet 4M Plus, both of which ran through the Word for Windows

test at a rate of about 10ppm. With increased print resolution (600 dots per inch), the HP duo barely slowed, achieving 9.7ppm in PCL mode. On our Lotus 1-2-3 test (PCL mode), the Lexmark IBM LaserPrinter 4039 12R Plus took top honours, scoring 4.0gppm. The 10ppm QMS 1060 Print system proved the best at producing CorelDRAW graphics, with throughput of 2.0gppm in PCL mode and 1.6gppm in PostScript.

This year's roundup included two GDI printers — the Lexmark WinWriter 600 and an entry from C-Tech Electronics. GDI printers, which are intended for Windows printing, do not use a printer description language such as PostScript or PCL (though the WinWriter does have resident PCL) but instead intercept the Windows Graphics Display Interface. The printers may rely partially or totally on the host machines' CPU memory for processing, eliminating costly parts and, in theory, improving performance. In GDI mode, the Lexmark WinWriter 600 excelled on our Windows applications tests, turning in the fastest scores among 8ppm machines in this roundup. The C-Tech unit, on the other hand, proved lacklustre in text throughput but on a par with similarly rated printers in producing Lotus 1-2-3 and CorelDRAW pages.

How we tested

The Text Speed test measures the printer's speed in producing 10 copies of a two-page business letter with 1 in margins.

The Graphics Speed test measures the printer's speed in producing two copies of a complex single-page graphic containing a TIFF image, horizontal and vertical greyscales, and line art. A print file is sent to the parallel port directly from DOS.

The Word for Windows test measures the printer's speed in producing a 10-page report that uses multiple fonts and type styles. We tested each printer with the Microsoft Windows driver recommended by the printer's manufacturer.

The Lotus 1-2-3 for Windows test measures the printer's speed in producing a complex two-page spreadsheet that contains pie, bar, and line charts. We tested each printer with the Microsoft Windows printer driver that was recommended by the printer's manufacturer.

The CorelDRAW test measures the printer's speed in producing a single-page CorelDRAW graphic that contains a TIFF image, horizontal and vertical greyscales, and line art. We tested each printer with the Microsoft Windows printer driver recommended by the printer's manufacturer.

are also now available, however not at the time of testing for this review. To upgrade this printer from its standard 2M to 6M costs an additional \$372.

Digital provides an optional Ethernet interface but offers no utility of its own for setup routines; you must rely on NetWare's PCONSOLE instead. We found the control panel's many layers of menus difficult to work with. Port switching among parallel, serial, AppleTalk, and network interfaces worked consistently, but emulation sensing, reliable under Windows, sometimes failed altogether under DOS. At press time, a representative from Digital told us the company was working on a ROM upgrade to fix the problem.

The 16MHz AMD 29200 RISC processor gives the 1800 good throughput for a 6ppm personal laser printer. Text and graphics quality is average for a 300dpi printer with resolution enhancement. The 1800 comes with 1M of

RAM expandable to 5M using standard SIMMs and a single 150-sheet multipurpose paper tray. A 250-page sheet feeder is optional. No network options are available.

As we went to press, Digital announced the DEclasser 3500, a 12ppm, 600dpi laser printer with PCL 5 and Adobe PostScript Level 2, and 7M of standard RAM. DEC officials say the printer's retail prices start at \$3,371.

DEC offers a standard warranty of one-year, return-to-base with its printers, with upgrade options available. Contact Digital Direct on 008 021 393.

Steven Chen

Epson EPL-5600

With its 6ppm EPL-5600 printer (\$1,959 RRP, but selling for \$1,700 on the street) Epson attempts to carve out a niche in the 600dpi presentation and business graphics market by attacking the problem of resolution improvement in three ways.

Resolution improvement technology smoothes jaggies. Super MicroArt Printing



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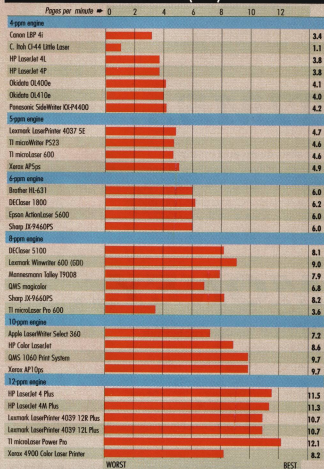
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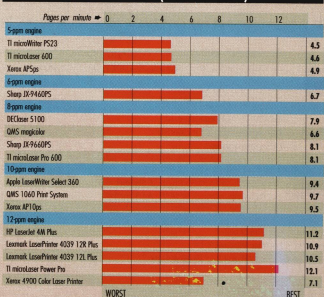
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Benchmark tests: Personal/workgroup lasers

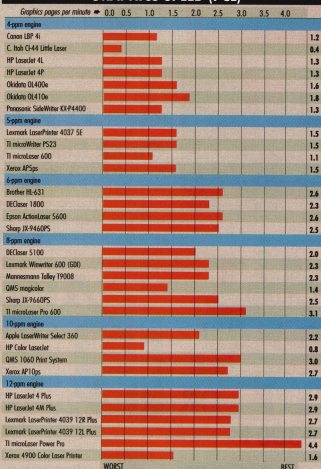
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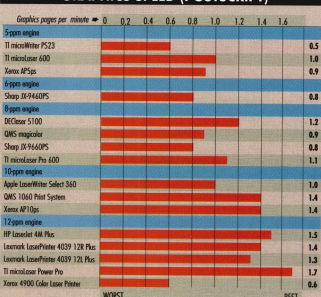
TEXT SPEED (POSTSCRIPT)

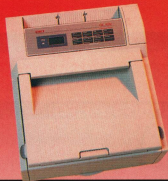


GRAPHICS SPEED (PCL)



GRAPHICS SPEED (POSTSCRIPT)





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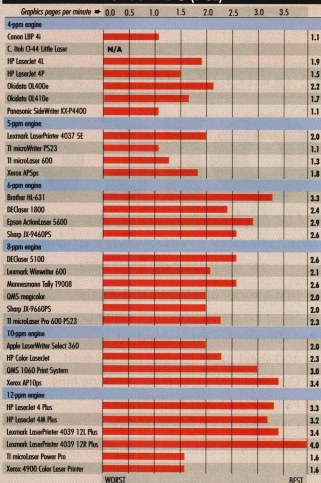
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Benchmark tests: Personal/workgroup lasers

WORD FOR WINDOWS (PCL)



LOTUS 1-2-3 (PCL)



(the use of finer and more consistently sized toner particles) raises general image quality. MicroGray Technology, available only with Epson's optional PostScript emulation, increases the number of grey levels. The result? We found the printed image had excellent detail but tended to be high-contrast and a little dark. With the PostScript Level 2 emulation installed, the



EPL-5600 offers automatic emulation switching.

Performance of the Minolta SP-6XH engine was above average. 300dpi text came out at 6ppm. Graphics performance was outstanding: 2.6 graphics pages per minute at 300dpi is a better showing than that of all but one of the 8ppm printers we reviewed. At 600dpi, the EPL-5600's 2.1gppm Graphics Speed score has no competition from other 6ppm or 8ppm models.

The 150-sheet cassette is small for most offices, and business users would probably need to add an optional 250-sheet feeder.

The EPL-5600's General Reference guide is straightforward and readable. Setting up the optional internal Ethernet network interface card — a potential nightmare — couldn't have been simpler. Put in the Epson disk and the network immediately reads the serial number and

recognises Microsoft Windows' HP LaserJet 4 printer driver.

The optional network interface card does not include remote management software. Non-network users can select paper size, paper tray, density, and other features from their PC through the Windows driver, however. A one-year onsite warranty is included with the printer.

As we were preparing this issue, Epson Australia released the EPL-3000. A new entry-level PCL 5e laser printer, the A4 EPL-3000 delivers 4ppm at 300dpi with Epson's own RITech (resolution improvement technology) to produce smoother edges. The new printer comes with a 12-month return-to-base warranty and costs \$1152. Street prices start as low as \$979. The product began shipping November 1, 1994.

For more details contact Epson Australia on (02) 415 9000.

Marino Delzotto

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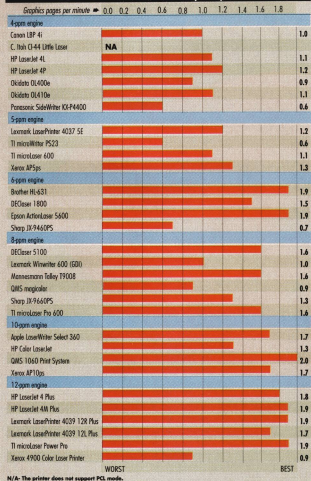
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Benchmark tests: Personal/workgroup lasers

CORELDRAW (PCL)



HP LaserJet 4L

HP LaserJet 4P

HP LaserJet 4 Plus

HP LaserJet 4M Plus

HP Color LaserJet

Hewlett-Packard succeeds at just about every level with a quintet of printers that offer superior performance and features, including colour in one case, at competitive prices. Street prices do vary for HP printers, but rather than quote specific prices, the company suggests that you shop around to get a better deal on the retail price tag.

For the small-office or home user, there is the 300dpi HP LaserJet 4L, an Editors' Choice selection last year, which costs \$1,435. The 4L is identical to the LaserJet

4ML, except that the \$2,152 4ML comes with Adobe PostScript Level 2, 4M of RAM, and a LocalTalk port. For the price-conscious business user, the HP LaserJet 4P, another 1993 Editors' Choice recipient, provides 600dpi resolution for a suggested retail price of \$1,944. The 4P is identical to the LaserJet 4MP, except that the 4MP comes with Adobe PostScript Level 2 interpreter, 6M of RAM, and a LocalTalk port for \$2,465.

For corporate users, the new HP LaserJet 4 Plus and the LaserJet 4M Plus offer 12ppm at \$3,472 and \$4,336, respectively. Finally, the new HP Color LaserJet adds a bright new dimension to laser printing at a retail price of \$13,520.

All the LaserJets are power-punching units, with the basic 4L turning itself off after 15 minutes of inactivity. All offer an Econo-Mode used for draft printing that consumes half the usual toner. All except the 4L and the 4ML employ resolution enhancement for smoothing jagged edges in text output. All come with a Bi-Tronics parallel port, which enables status reports to be sent back to the user, and Memory Enhancement technology, which compresses data to make more efficient use of memory.

The high-tech design of the 4L eschews a power switch. This 4ppm printer uses the Canon PX engine and comes with a 100-sheet paper cassette, 1M of

RAM, and 26 scalable Intellifont typefaces. The 4L's text and graphics are crisp and well defined, with jaggies only slightly evident. Its speed is comparable to others in its class.

The 600dpi resolution of the 4P Canon FXII engine is a key ingredient to producing superb output, but at 4ppm, the engine is among the slowest for printers in its price range. Standard items with the 4P are a 250-sheet paper cassette, 2M of RAM, and 45 scalable typefaces (35 Intellifont and 10 TrueType). Text and graphics are crisp and well defined, with jagged edges nearly imperceptible.

The 4 Plus and 4M Plus are identical, except that the 4M Plus has several key options built in. Whereas the 4 Plus comes standard with 2M of RAM, the 4M Plus sports

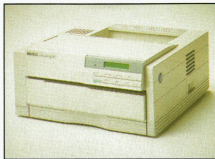


6M. The 4M Plus also has an inbuilt Adobe PostScript Level 2 SIMM, and an inbuilt HP JetDirect card for connecting to LocalTalk and Ethernet networks. A 25MHz Intel 80960 and the 600dpi, 12ppm Canon EX engine assure high performance and superb print quality. Text and graphics quality are on a par with those of the 4P, but the 4M Plus' print speed is among the fastest of the workgroup laser printers we reviewed.

The internal JetDirect network interface card, standard with the 4M Plus, is optional with the 4 Plus. Installation of each printer onto the network is done for you by the HP JetAdmin utility, which handles plenty of remote management functions as well as grad-and-drop printing.

The HP Color LaserJet adds a new dimension of colour output to the LaserJet line. A 300dpi text and graphics printer using PCL 5 (PostScript is an optional extra), the Color LaserJet has four toner reservoirs, one each for cyan, magenta, yellow and black. Unlike the QMS magicolor and the Xerox 4900 Color Laser Printer, however, which have four separate developer assemblies, the Color LaserJet has two. Powered by a 20MHz AMD 29030 RISC processor, this printer is rated at two colour ppm and 10 monochrome ppm.

The HP Color LaserJet's 300dpi resolution produces output inferior to that of the 600 by 600 magicolor and the 1200 by 300



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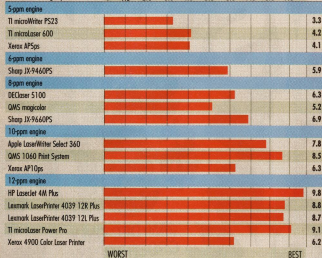
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Benchmark tests: Personal/workgroup lasers

WORD FOR WINDOWS (POSTSCRIPT)

Pages per minute = 0 1.0 2.0 3.0 4.0 5.0 6.0 7.0 8.0 9.0

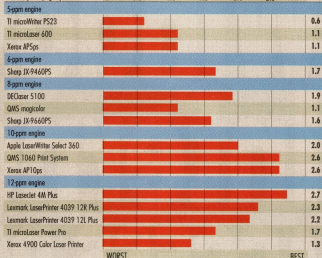


WORST

BEST

LOTUS 1-2-3 FOR WINDOWS (POSTSCRIPT)

Graphics pages per minute = 0 0.5 1.0 1.5 2.0 2.5



WORST

BEST

Xerox 4900. While colours were bright, dithering patterns were noticeable, especially in the orange slice of the pie chart in our business graphic. Still, colour output is perfectly acceptable for the average business application and the convenience of mixing black and colour laser output on the same page is undeniable. Keep in mind, also, that the Color LaserJet's price tag is considerably less than the magicolor and \$1650 less than the 4900, and its cost per page (with 20% coverage) is 16 cents compared with the magicolor's 30 cents and 4900's 37 cents.

The Windows driver for the Color LaserJet comes with HP's ColorSmart, which adjusts colours automatically for text, business graphics, and continuous tone images, even if they're on the same page.

HP offers a one-year return to base warranty with its printers and the company can be reached on 13 13 47.

Joseph Desposito

Lexmark LaserPrinter 4037 5E

Lexmark WinWriter 600

LaserPrinter 4039 12R Plus

LaserPrinter 4039 12L Plus

Former IBM division Lexmark offers a complete range of personal/workgroup laser printers, from entry-level GDI and PCL through to high-end 12ppm lasers.

The \$1,342 LaserPrinter 4037 5E, a 5ppm PCL 4 printer holds its own at the low end with its full line of paper options and straightforward control panel. The \$2236 Lexmark WinWriter 600 offers 600 dots per inch to Windows users via GDI, at a rated speed of 8ppm, and 300dpi to DOS users via PCL 4 at a rated speed of 10ppm. Two models based on the Lexmark 4039 12ppm laser engine and powered by a 16MHz AMD 29200 RISC processor improve on last year's Lexmarks by including full 600dpi support for PCL 5e and PostScript Level 2 as well as remote management features.

The 4037 5E's 16-character by 4-line LCD sets it apart from other low-end printers by leaving ample room for intelligible instructions in plain English. Text is dark and greys are well dithered for 300dpi. Text output, at 4.7ppm, falls slightly short of the rated speed. Graphics performance, at 1.5 graphics pages per minute, is about average for a printer in this price range.

The WinWriter 600, which comes with one 200-sheet paper cassette, is one of the first GDI printers to use Microsoft At Work software to access available processing power and memory from your PC. On our Windows applications tests the printer's GDI mode outscored most 600dpi PCL printers at 1.3ppm on our Word for Windows test. The WinWriter 600 was also fast in its 300dpi DOS PCL 4 emulation, printing 2.3ppm on our Graphics Speed test. The control panel is minimal; controls and printer status mes-

sages can be accessed from an included Windows-based utility. Output was clean and crisp, with minimal bandwidth in greyscale graphics.

The LaserPrinter 4039 12L Plus which comes with a 500-sheet paper cassette, costs \$4,537. The LaserPrinter 4039 12R Plus, with a smaller 200-sheet standard paper cassette and lower duty cycle, sells for \$3,426.

The 12L Plus and 12R Plus offer excellent remote printer management. The new Windows-based MarkVision utility makes installation a breeze and recreates the printer control panel (green background and all) on the user's screen, complete with active buttons the user can click to access control panel functions. Novell's NetWare administrators can monitor multiple Lexmarks, with MarkVision helping to track and correct printer problems. The 12R Plus supports optional Ethernet and Token Ring interface cards, which can switch automatically among most of the popular NOSs. An external network interface box is available for the 4037 5E. Included with the interfaces is a DOS-based utility, which monitors printers remotely and can bypass NetWare 3.x's PCONSOLE completely.

Text output from the 12L Plus and 12R Plus printers was crisp; 600dpi graphics in both PCL and PostScript showed some greyscale banding but were of acceptable quality. Graphics performance at 600dpi was 1.8ppm in PCL and 1.0ppm in PostScript, both slightly below average for a 12ppm engine.

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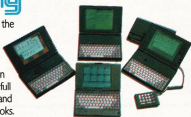
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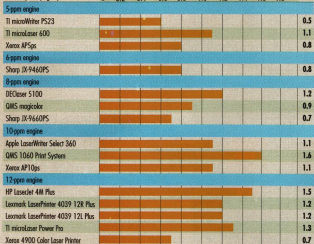


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Benchmark tests: Personal/workgroup lasers

CORELDRAW (POSTSCRIPT)

Graphics pages per minute = 0 0.2 0.4 0.6 0.8 1.0 1.2 1.4 1.6 1.8



Lexmark fills out its laser lineup with two recent debuts, however these new products were released too late for testing. At the low-end, the \$999 WinWriter 200 is aimed at the SOHO market, while the \$1,643 ValueWriter 600 is targeted at the entry-level business market with low-budget but high-quality needs.

Like the WinWriter 600, the new WinWriter 200 is GDI-driven from Windows, but provides less grunt to keep costs down. It is rated at 300dpi and 4ppm, and comes standard with 22 TrueType fonts and a two-year, return-to-base warranty. The 5ppm ValueWriter 600 features PCL 5

emulation and offers laser-quality printing to 600dpi and a duty cycle of 16,000 pages per month. The ValueWriter comes with a one-year on-site warranty.

Lexmark cut its recommended retail prices late October to bring them in line with its street prices and is currently on a push to promote its brand identity with sponsorship deals such as the recently launched 'Lexmark' 18-foot skiff, racing from Double Bay Yacht Club on Sydney Harbour. IBM, which still holds a 10 per cent ownership in Lexmark, now rebadges the company's printers, and print engines and

technology. For more details, contact Lexmark on (02) 930 3500.

Steven Chen

Mannesmann Tally T9008

The \$2865 Mannesmann Tally T9008 (estimated street price, \$2640) has all the standard features of today's workgroup laser printer: 600dpi PCL 5e output; simultaneously active serial and parallel interfaces; a 20MHz Intel i80960KA RISC processor; an 8ppm TEC LB 3500 engine; a 30-watt, power-saving sleep mode; and

Lexmark cut its recommended retail prices late October to bring them in line with its street prices and is currently on a push to promote its brand identity

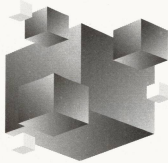
Mannesmann Tally's own Edge enhancement Technology for smoothing text and graphics jaggies. An optional internal Ethernet adaptor (\$932) gives the printer the potential for remote management from a PC. Unfortunately, Mannesmann Tally's DOS and Windows network utilities were not ready in time for this review. Neither was the PostScript model; the T9008PS, however this will be available this month.

The T9008 comes with 45 PCL 5e fonts, but users who want PostScript will have to pay an additional \$893 to upgrade to PostScript Level 2. Output for PCL text is typical for 600dpi printers, but graphic images are on the dark side.

The T9008 hit above-average scores on our applications tests. PCL throughput at 300dpi was 7.9ppm for text and 2.3 graphics pages per minute for graphics. In 600dpi PCL 5e the T9008 turned out 1.9ppm, outclassing the DEClaser 5100. Windows applications test scores were similarly strong for a printer in this price range.

The T9008's 250-sheet adjustable cassette and 100-sheet multipurpose feeder tended to jam and sometimes the paper didn't feed at all, though Mannesmann Tally was able to solve these problems.

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SYSTAT 6.0 for DOS offers even more statistical tools: ■ quality control ■ design of experiments ■ survival analysis ■ sampling ■ logistic regression ■ probit analysis ■ matrix algebra ■ two stage least squares ■ canonical and set correlation ■ reliability analysis ■ linear programming ■ signal detection ■ expected mean squares, and more. For market researchers, new SYSTAT for DOS provides: ■ complex stub-and-banner tables with multi-response data ■ conjoint and correspondence analyses ■ tree classification ■ perceptual mapping.

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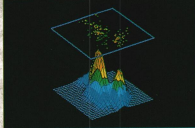
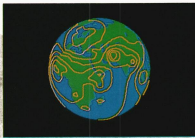
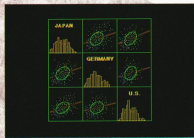
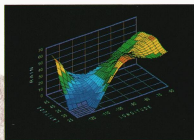
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1985	14	16	19	22	24	26	29	32
1986	15	17	20	23	25	27	30	33
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PS Text Speed: 9.4 ppm
PS Graphics Speed: 1.0 gppm
PCL WINDOWS APPLICATIONS:
Word for Windows: 3.6 ppm
Lotus 1-2-3 for Windows: 2.0 gppm
CorelDRAW: 1.7 gppm
PS WINDOWS APPLICATIONS:
Word for Windows: 7.8 gppm
Lotus 1-2-3 for Windows: 2.0 gppm
CorelDRAW: 1.1 gppm

**Brother HL-630**

6-ppm laser printer (Brother HL-630 engine) with 300-dpi output, PCL 4

PCL Text Speed: 6.0 ppm
PCL Graphics Speed: 2.6 gppm
PS Text Speed: N/A
PS Graphics Speed: N/A
PCL WINDOWS APPLICATIONS:
Word for Windows: 5.1 ppm
Lotus 1-2-3 for Windows: 3.3 gppm
CorelDRAW: 1.9 gppm

**Canon LBP-430**

4-ppm laser printer (Canon LBP-PX engine) with 300-dpi output, PCL 5

PCL Text Speed: 3.4 ppm
PCL Graphics Speed: 1.2 gppm
PCL WINDOWS APPLICATIONS:
Word for Windows: 3.1 ppm
Lotus 1-2-3 for Windows: 1.1 gppm
CorelDRAW: 1.0 gppm

**C. Itoh CI-44 Little Laser**

4-ppm laser printer (TEC LB-1000 engine) with 300-dpi output, GDI, Adobe PostScript Level 1 (optional), PCL 4 (optional)

PCL Text Speed: 1.1 ppm
PCL Graphics Speed: 0.4 gppm
PS Text Speed: 1.6 ppm
PS Graphics Speed: 0.3
GDI WINDOWS APPLICATIONS:
Word for Windows: 2.7 ppm
Lotus 1-2-3 for Windows: 2.2 gppm
CorelDRAW: 1.6 gppm



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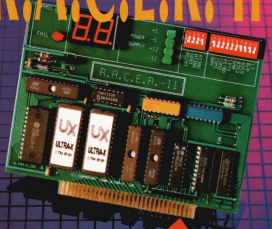
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DEClaSer 1800

6-ppm laser printer (Minolta SP-6HX engine) with 300-dpi output, PCL 5

PCL Text Speed: 6.2 ppm
 PCL Graphics Speed: 2.3 ppm
PCL WINDOWS APPLICATIONS:
 Word for Windows: 5.5 ppm
 Lotus 1-2-3 for Windows: 2.6 ppm
 CorelDRAW: 1.9 ppm

**HP LaserJet 4P**

4-ppm laser printer (Canon PX2 engine) with 600-dpi output, Adobe PostScript Level 2 (optional), PCL 5e

PCL Text Speed: 3.8 ppm
 PCL Graphics Speed: 1.3 ppm
PCL WINDOWS APPLICATIONS:
 Word for Windows: 3.5 ppm
 Lotus 1-2-3 for Windows: 1.5 ppm
 CorelDRAW: 1.2 ppm

**DEClaSer 5100**

8-ppm laser printer (Canon LBP-EX engine) with 600-dpi output, Adobe PostScript Level 2, PCL 5e

PCL Text Speed: 8.1 ppm
 PCL Graphics Speed: 2.9 ppm
 PS Text Speed: 7.9 ppm
 PS Graphics Speed: 1.2 ppm
PCL WINDOWS APPLICATIONS:
 Word for Windows: 6.6 ppm
 Lotus 1-2-3 for Windows: 2.6 ppm
 CorelDRAW: 1.6 ppm
PS WINDOWS APPLICATIONS:
 Word for Windows: 6.3 ppm
 Lotus 1-2-3 for Windows: 1.9 ppm
 CorelDRAW: 1.2 ppm

**HP LaserJet 4 Plus**

12-ppm laser printer (Canon EX engine) with 600-dpi output, Adobe PostScript Level 2, PCL 5e

PCL Text Speed: 11.5 ppm
 PCL Graphics Speed: 2.9 ppm
PCL WINDOWS APPLICATIONS:
 Word for Windows: 9.7 ppm
 Lotus 1-2-3 for Windows: 3.3 ppm
 CorelDRAW: 1.8 ppm

**Epson ActionLaser 1600**

6-ppm laser printer (Minolta SP-6XH engine) with 600-dpi output, PostScript Level 2 clone (optional), PCL 5e

PCL Text Speed: 6.0 ppm
 PCL Graphics Speed: 2.6 ppm
PCL WINDOWS APPLICATIONS:
 Word for Windows: 5.9 ppm
 Lotus 1-2-3 for Windows: 2.9 ppm
 CorelDRAW: 1.9 ppm

**HP LaserJet 4M Plus**

12-ppm laser printer (Canon EX engine) with 600-dpi output, Adobe PostScript Level 2, PCL 5e

PCL Text Speed: 11.3 ppm
 PCL Graphics Speed: 2.9 ppm
 PS Text Speed: 11.2 ppm
 PS Graphics Speed: 1.9 ppm
PCL WINDOWS APPLICATIONS:
 Word for Windows: 10.0 ppm
 Lotus 1-2-3 for Windows: 3.2 ppm
 CorelDRAW: 1.8 ppm
PS WINDOWS APPLICATIONS:
 Word for Windows: 9.6 ppm
 Lotus 1-2-3 for Windows: 2.7 ppm
 CorelDRAW: 1.5 ppm

**HP LaserJet 4L**

4-ppm laser printer (Canon PX engine) with 300-dpi output, PCL 5

PCL Text Speed: 3.0 ppm
 PCL Graphics Speed: 1.3 ppm
PCL WINDOWS APPLICATIONS:
 Word for Windows: 3.4 ppm
 Lotus 1-2-3 for Windows: 1.9 ppm
 CorelDRAW: 1.1 ppm

**HP Color LaserJet**

10-ppm B-size color laser printer (proprietary Konica engine) with 300-dpi output, Adobe PostScript Level 2 (optional), enhanced PCL 5

PCL Text Speed: 8.6 ppm
 PCL Graphics Speed: 0.8 ppm
PCL WINDOWS APPLICATIONS:
 Word for Windows: 6.8 ppm
 Lotus 1-2-3 for Windows: 2.3 ppm
 CorelDRAW: 1.3 ppm



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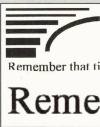


Lexmark IBM LaserPrinter 4037 5E**5-ppm LED printer (Lexmark 4037 engine) with 300-dpi output, PCL 4**

PCL Text Speed: 4.7 ppm
 PCL Graphics Speed: 1.5 gppm
PCL WINDOWS APPLICATIONS:
 Word for Windows: 4.2 ppm
 Lotus 1-2-3 for Windows: 2.0 gppm
 CorelDRAW: 1.2 gppm

**Mannesmann Tally T900S****8-ppm laser printer (TEC LB 3500 engine) with 600-dpi output, PostScript Level 2 clone (optional), PCL 5e**

PCL Text Speed: 7.9 ppm
 PCL Graphics Speed: 2.3 gppm
PCL WINDOWS APPLICATIONS:
 Word for Windows: 7.1 ppm
 Lotus 1-2-3 for Windows: 2.6 gppm
 CorelDRAW: 1.6 gppm

**Lexmark Winwriter 600****8-ppm laser printer (Lexmark 4029 engine) with 600-dpi output, PCL 4**

PCL Text Speed: 8.0 ppm
 PCL Graphics Speed: 2.8 gppm
PCL WINDOWS APPLICATIONS:
 Word for Windows: 5.6 ppm
 Lotus 1-2-3 for Windows: 2.1 gppm
 CorelDRAW: 1.0 gppm
GDI WINDOWS APPLICATIONS:
 Word for Windows: 7.6 ppm
 Lotus 1-2-3 for Windows: 2.7 gppm
 CorelDRAW: 1.9 gppm

**Okidata OL400e****4-ppm LED printer (OKI OL400e engine) with 300-dpi output, PCL 4.5**

PCL Text Speed: 4.1 ppm
 PCL Graphics Speed: 1.6 gppm
PCL WINDOWS APPLICATIONS:
 Word for Windows: 3.8 ppm
 Lotus 1-2-3 for Windows: 2.2 gppm
 CorelDRAW: 0.9 gppm

**Lexmark IBM LaserPrinter 4039 12R Plus****12-ppm laser printer (Lexmark 4039 engine) with 600-dpi output, GDI, PostScript Level 2 clone, PCL 5e**

PCL Text Speed: 10.7 ppm
 PCL Graphics Speed: 2.7 gppm
 PS Text Speed: 10.9 ppm
 PS Graphics Speed: 1.4 gppm
PCL WINDOWS APPLICATIONS:
 Word for Windows: 8.0 ppm
 Lotus 1-2-3 for Windows: 4.0 gppm
 CorelDRAW: 1.7 gppm
PS WINDOWS APPLICATIONS:
 Word for Windows: 8.8 gppm
 Lotus 1-2-3 for Windows: 2.3 gppm
 CorelDRAW: 1.2 gppm

**Okidata OL410e****4-ppm LED printer (OKI OL400e engine) with 300-dpi output, PCL 5**

PCL Text Speed: 4.0 ppm
 PCL Graphics Speed: 1.8 gppm
PCL WINDOWS APPLICATIONS:
 Word for Windows: 3.6 ppm
 Lotus 1-2-3 for Windows: 1.7 gppm
 CorelDRAW: 0.9 gppm

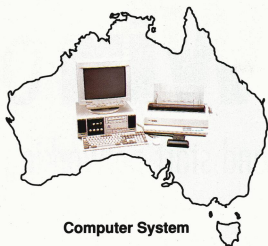
**Lexmark IBM LaserPrinter 4039 12L Plus****12-ppm laser printer (Lexmark 4039 engine) with 600-dpi output, GDI PostScript Level 2 clone, PCL 5e**

PCL Text Speed: 10.7 ppm
 PCL Graphics Speed: 2.7 gppm
 PS Text Speed: 10.9 ppm
 PS Graphics Speed: 1.3 gppm
PCL WINDOWS APPLICATIONS:
 Word for Windows: 8.0 ppm
 Lotus 1-2-3 for Windows: 3.4 gppm
 CorelDRAW: 1.9 gppm
PS WINDOWS APPLICATIONS:
 Word for Windows: 8.7 ppm
 Lotus 1-2-3 for Windows: 2.2 gppm
 CorelDRAW: 1.2 gppm

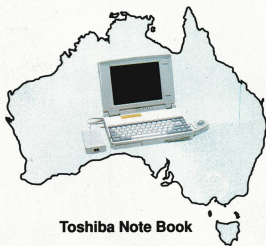
**Panasonic SideWriter KX-P4400****4-ppm LED printer (Matsushita 4400 engine) with 300-dpi output, Adobe PostScript Level 2 (optional), PCL 4**

PCL Text Speed: 4.2 ppm
 PCL Graphics Speed: 1.3 gppm
PCL WINDOWS APPLICATIONS:
 Word for Windows: 3.8 ppm
 Lotus 1-2-3 for Windows: 1.1 gppm
 CorelDRAW: 0.6 gppm





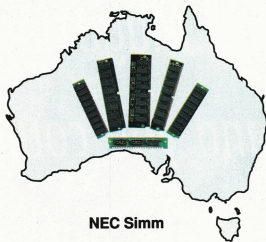
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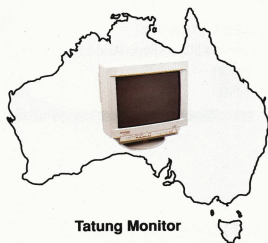
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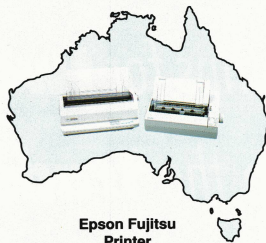
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2. Comdex/Sucesu, Rio de Janeiro, **Brazil.** 4th-7th April.

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4. Comdex Spring, Atlanta, Georgia, **USA.** 23rd-26th May.

5. Computex Taipei '95, Taipei, **Taiwan.** 2nd-6th June.

6. PC Show, **Singapore.** 15th-18th June.

7. PC Expo, New York, **USA.** 28th-30th June.

8. Network + Interop, Tokyo, **Japan.** 25th-29th July.

9. Network + Interop, Paris, **France.** 6th-10th October.

10. Comdex Fall, Las Vegas, Nevada, **USA.** 14th-18th November.

QMS 1060 Print System

10-ppm laser printer (proprietary engine) with 600-dpi output, PostScript Level 2 clone, PCL 5

PCL Text Speed: 8.7 gpm
PCL Graphics Speed: 3.0 gpm
PS Text Speed: 8.7 gpm
PS Graphics Speed: 1.4 gpm
PCL WINDOWS APPLICATIONS:
Word for Windows: 8.7 gpm
Lotus 1-2-3 for Windows: 3.0 gpm
CorelDRAW: 2.0 gpm
PS WINDOWS APPLICATIONS:
Word for Windows: 8.5 gpm
Lotus 1-2-3 for Windows: 2.5 gpm
CorelDRAW: 1.5 gpm

**QMS magicolor**

8-ppm color laser printer with 600-dpi output (requires memory upgrade), PostScript Level 2 clone, PCL 5C

PCL Text Speed: 8.8 gpm
PCL Graphics Speed: 1.4 gpm
PS Text Speed: 6.6 gpm
PS Graphics Speed: 0.9 gpm
PCL WINDOWS APPLICATIONS:
Word for Windows: 4.2 gpm
Lotus 1-2-3 for Windows: 2.0 gpm
CorelDRAW: 0.9 gpm
PS WINDOWS APPLICATIONS:
Word for Windows: 5.2 gpm
Lotus 1-2-3 for Windows: 1.1 gpm
CorelDRAW: 0.9 gpm

**TI microLaser 600**

5-ppm laser printer (Samsung SL 2050 engine) with 600-dpi output, Adobe PostScript Level 2, PCL 5

PCL Text Speed: 4.6 gpm
PCL Graphics Speed: 1.5 gpm
PS Text Speed: 4.0 gpm
PS Graphics Speed: 1.0 gpm
PCL WINDOWS APPLICATIONS:
Word for Windows: 3.0 gpm
Lotus 1-2-3 for Windows: 1.3 gpm
CorelDRAW: 1.1 gpm
PS WINDOWS APPLICATIONS:
Word for Windows: 4.2 gpm
Lotus 1-2-3 for Windows: 1.1 gpm
CorelDRAW: 1.1 gpm

**Sharp JX-9660PS**

8-ppm laser printer (Sharp JX-9660 engine) with 600-dpi output, PostScript Level 1 clone, PCL 5

PCL Text Speed: 8.2 gpm
PCL Graphics Speed: 2.5 gpm
PS Text Speed: 8.1 gpm
PS Graphics Speed: 0.8 gpm
PCL WINDOWS APPLICATIONS:
Word for Windows: 7.3 gpm
Lotus 1-2-3 for Windows: 2.0 gpm
CorelDRAW: 1.3 gpm
PS WINDOWS APPLICATIONS:
Word for Windows: 5.9 gpm
Lotus 1-2-3 for Windows: 1.6 gpm
CorelDRAW: 0.7 gpm

**TI microWriter PS23**

5-ppm LED printer (Samsung SL 1050 engine) with 300-dpi output, Adobe PostScript Level 1, PCL 4

PCL Text Speed: 4.6 gpm
PCL Graphics Speed: 1.1 gpm
PS Text Speed: 4.5 gpm
PS Graphics Speed: 0.5 gpm
PCL WINDOWS APPLICATIONS:
Word for Windows: 4.2 gpm
Lotus 1-2-3 for Windows: 1.1 gpm
CorelDRAW: 0.8 gpm
PS WINDOWS APPLICATIONS:
Word for Windows: 3.3 gpm
Lotus 1-2-3 for Windows: 0.6 gpm
CorelDRAW: 0.5 gpm

**Sharp JX-9460PS**

6-ppm laser printer (Sharp 9460 engine) with 600-dpi output, PostScript Level 1 clone, PCL 5

PCL Text Speed: 6.0 gpm
PCL Graphics Speed: 2.5 gpm
PS Text Speed: 5.7 gpm
PS Graphics Speed: 0.8 gpm
PCL WINDOWS APPLICATIONS:
Word for Windows: 6.3 gpm
Lotus 1-2-3 for Windows: 2.6 gpm
CorelDRAW: 0.7 gpm
PS WINDOWS APPLICATIONS:
Word for Windows: 5.9 gpm
Lotus 1-2-3 for Windows: 1.7 gpm
CorelDRAW: 0.8 gpm

**TI microLaser Pro 600 PS23**

8-ppm laser printer (Sharp JX-9600 engine) with 600-dpi output, Adobe PostScript Level 2, PCL 5

PCL Text Speed: 3.6 gpm
PCL Graphics Speed: 3.1 gpm
PS Text Speed: 8.1 gpm
PS Graphics Speed: 1.1 gpm
PCL WINDOWS APPLICATIONS:
Word for Windows: 3.1 gpm
Lotus 1-2-3 for Windows: 2.3 gpm
CorelDRAW: 1.6 gpm
PS WINDOWS APPLICATIONS:
Word for Windows: N/A
Lotus 1-2-3 for Windows: N/A
CorelDRAW: N/A

**TI microLaser Power Pro**

12-ppm laser printer (Sharp JX-9612 engine) with 600-dpi output, Adobe PostScript Level 2, PCL 5

PCL Text Speed: 12.1 gpm
PCL Graphics Speed: 4.4 gpm
PS Text Speed: 12.1 gpm
PS Graphics Speed: 1.7 gpm
PCL WINDOWS APPLICATIONS:
Word for Windows: 7.9 gpm
Lotus 1-2-3 for Windows: 1.6 gpm
CorelDRAW: 1.5 gpm
PS WINDOWS APPLICATIONS:
Word for Windows: 9.1 gpm
Lotus 1-2-3 for Windows: 1.7 gpm
CorelDRAW: 1.2 gpm



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- * 8 pages per minute
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- * 46 resident PCL fonts
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- * Australian built



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Fast Professional Business Partner

- * 10 pages per minute
- * 600 dpi resolution
- * 46 resident PCL fonts
- * 6MB memory
- * Australian built



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- * 13 pages per minute
- * 600 dpi resolution
- * 46 resident PCL fonts
- * 2 x 250 sheet paper trays
- * Australian built



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- * 26 resident PCL fonts
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PCL Graphics Speed: 1.5 ppm
PS Text Speed: 4.9 ppm
PS Graphics Speed: 0.9 ppm
PCL WINDOWS APPLICATIONS:
Word for Windows: 4.5 ppm
Lotus 1-2-3 for Windows: 1.8 ppm
CorelDRAW: 1.3 ppm
PS WINDOWS APPLICATIONS:
Word for Windows: 4.1 ppm
Lotus 1-2-3 for Windows: 1.1 ppm
CorelDRAW: 0.8 ppm



The only paper option for the T9008 is a second 500-sheet paper bin.

GPM Systems on (03) 819 0233 offers a 12-month return-to-base warranty with the T9008.

Joseph Desposito

Okidata OL400e**Okidata OL410e**

Okidata's low-priced OL400e and OL410e are 4ppm LED page printers designed for home offices and individual users. Identical in their compact size, power-saving sleep mode, straightforward front panel controls, and 100-sheet built-in paper capacity, the two models differ primarily in their emulations. The \$1390 OL400e (street around \$1099) emulates the 300dpi HP LaserJet IIp Plus. The \$1789 OL410e (about \$1450 on the street) emulates the HP LaserJet III, but its drivers and firmware enhance its 300dpi output to resemble output from 600dpi models. Both models fill only 1.3 square feet of desk space, although pull-out output trays increase the printer's length a few inches. Hardware installation is straightforward, with separate conductor cartridge and toner.

The OL400e, an Editor's Choice recipient in 1993, comes with 512K of RAM (expandable to 4.5M) and 44 bitmaps fonts. The OL410e, which emulates the LaserJet III, has 2M of RAM (expandable to 5M),

and 12 HP-compatible bitmapped fonts to the OL400e and OL410e.

Okidata also boasts the OL410e's effective resolution to 300 by 1200 through a proprietary enhancement technique the company claims creates 600 by 600dpi print quality. While superior to ordinary 300dpi output, it's still grainier and less subtle than the output from true 600dpi hardware. Both models produce dark and consistent blacks and smooth shading.

Both the OL400e and OL410e print text at about 4ppm; the OL400e prints graphics at 1.6 graphics pages per minute, the OL410e at 1.8ppm — relatively fast speeds for this class of printer. Okidata's LED printers do not offer the speed or paper capacity of slightly more expensive models but for individual users, they're exceptionally compact and economical.

The Australia distributor, IPL Datron, offers a 12-month return-to-base warranty with these printers, and can be contacted on (02) 698 8211.

Edward Mendelson

Panasonic SideWriter KX-P4400

Designed for use in a small home or office, the Panasonic SideWriter KX-P4400 LED page printer handles basic printing needs at a rock-bottom price. Listing for \$999 and selling on the street for \$899, the KX-P4400 offers 300dpi resolution and PCL 4 compatibility at a rated speed of 4 pages per minute.

The KX-P4400 owes its SideWriter nickname to its minitower design. Its 12.5 by 30.5cm footprint makes it the smallest of this group. Setup was straightforward until

Xerox 4510ps

10-ppm laser printer (Fuji Xerox XP-10 engine) with 600-dpi output, Adobe PostScript Level 2, PCL 5e

PCL Text Speed: 9.7 ppm
PCL Graphics Speed: 2.7 ppm
PS Text Speed: 9.5 ppm
PS Graphics Speed: 1.4 ppm
PCL WINDOWS APPLICATIONS:
Word for Windows: 8.7 ppm
Lotus 1-2-3 for Windows: 3.4 ppm
CorelDRAW: 1.7 ppm
PS WINDOWS APPLICATIONS:
Word for Windows: 6.3 ppm
Lotus 1-2-3 for Windows: 2.6 ppm
CorelDRAW: 1.1 ppm

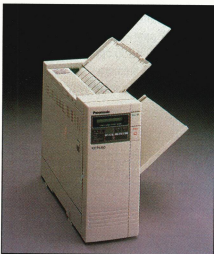
**Xerox 4900 Color Laser Printer**

12-ppm color laser printer (Hitachi color engine) with 1,200-by 300-dpi output*, Adobe PostScript Level 2, PCL 5

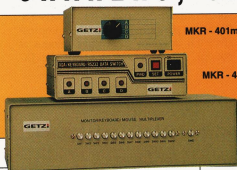
PCL Text Speed: 8.2 ppm
PCL Graphics Speed: 1.9 ppm
PS Text Speed: 7.1 ppm
PS Graphics Speed: 0.6 ppm
PCL WINDOWS APPLICATIONS:
Word for Windows: 5.7 ppm
CorelDRAW: 0.8 ppm
PS WINDOWS APPLICATIONS:
Word for Windows: 6.7 ppm
Lotus 1-2-3 for Windows: 1.3 ppm
CorelDRAW: 0.7 ppm
*Requires memory upgrade.



we got to the Panasonic engine's separate toner cartridge and drum. The need to tape over a small opening in the toner housing to prevent powder from spilling made cartridge installation awkward. Panasonic claims later units have a different installation that doesn't require tape. A 100-sheet multipurpose paper tray opens on the right side of the KX-P4400, almost doubling its 12.5cm width. A 50-sheet exit tray opens at the top, adding about 5cm to the height. The biggest problem was printing envelopes. The feeder took them in, but the



MONITOR - KEYBOARD - MOUSE SHARERS, SPLITTERS & EXTENDERS



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Monitor, keyboard & mouse to switch : 6 ft (1.8m)

\$390

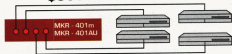


MKR - 401AU

4 PC's to 1 keyboard, monitor & mouse. Can be daisy chained to up to 7 PC's

- Power supply – (DC 12.5V/900mA) supplied
- Scanning mode – Scans & displays each computer's operations for 3 or 10 seconds (selectable)
- Locked on mode
- Daisy chain – up to 7 computers
- Maximum transmission distance – Computer to controller : 100 ft (30m)
Monitor, keyboard & mouse to controller : 50 ft (30m)

\$590

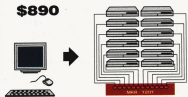


MKR - 1201

**12 PC's to 1 keyboard,
monitor & mouse**

- Power supply – (DC 12V/500mA)
- Auto reboot
- Daisy chain to 24, 36, 48 etc computers
- Maximum transmission distance – Computer to switch : 25 ft (15m)
Monitor, keyboard & mouse to switch : 50 ft (30m)

\$890

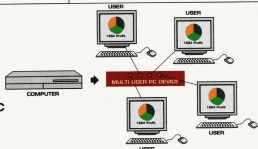


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8 Monitor **\$590**



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- | | |
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Specify when ordering:
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printer invariably choked on them as they came out.

In performance testing, the KX-P4400 printed text slightly faster than 4ppm, its rated speed. Graphics printed one-third as fast as its rated speed. At 0.6 graphics pages per minute, graphics printing in our CorelDRAW test was on the slow side, however. Graphics printed well, with just slight greyscale banding. Text printing is dark and even but the lack of resolution enhancement clearly shows in jagged curves and lack of definition at smaller font sizes.

The KX-P4400 comes standard with 1M of RAM and 14 nonscalable fonts (mostly variations of Courier) for portrait and landscape modes. Panasonic provides a 12-month onsite warranty within 50km of an authorised centre and the company can be reached on (02) 986 7400.

Joseph Desposito

QMS 1060 Print System

QMS magicolor

QMS offers two versatile workgroup printers, the 600dpi monochrome QMS 1060 Print System and the QMS magicolor — one of the first 600dpi colour laser printers on the market. Both feature QMS's Crown architecture, which can simultaneously process multiple jobs with multiple emulations from multiple ports. Optional RISC-based network interface cards can switch among multiple network protocols. Remote management utilities are planned but were not available at the time of review.

The 10ppm QMS 1060 comes with 8M of RAM for \$5,197 (expandable to 64M), a 500-sheet standard paper cassette, and a 150-sheet multipurpose cassette that supports paper as well as transparencies and No. 10 envelopes. PostScript output at 600dpi is excellent, with crisp text and subtle greyscaling. Performance was above average for both text and graphics.

With a retail price of \$26,614 (\$23,000 on the street) the magicolor, rated at eight monochrome ppm and two colour ppm, offers 600dpi PostScript (using QMS's PostScript clone) and 300dpi PCL 5C printing in both monochrome and colour.

The magicolor's plain-paper colour output showed more banding and graininess than most thermal wax printers, but it definitely outclassed that of the HP Color LaserJet. At 300 to 300dpi, its colour output was equivalent to the Xerox 4900 Color Laser Printer output in 1200 by 300 mode. Colours were bright and fully saturated, and colour registration was more accurate than that of the Xerox 4900. At default settings the magicolor's 600 by 600 output

was too dark, but a little tweaking of colour settings can produce dramatically better results. The magicolor comes standard with 28M of RAM and the company targets network environments. Price per printout for 5% coverage of each colour (20% total)

The magicolor's plain-paper colour output showed more banding and graininess than most thermal wax printers, but it definitely outclassed that of the HP Color LaserJet.

is around 30 cents, compared to the Xerox 4900's 37 cents and the HP Color LaserJet's 16 cents.

The Hitachi laser engine, with its 33MHz Intel 809060CF RISC processor, showed respectable performance, printing text at 6.8ppm in PCL 5 and 6.6ppm in PostScript. Monochrome graphics speed was average at 1.4 graphics pages per minute in PCL 5 at 300dpi and 0.9ppm in PostScript, in both 300 and 600dpi.

QMS's standard warranty is 12-month return-to-base. The company can be contacted on (02) 901 3235.

Bruce Brown and Steven C M Chen

Sharp JX-9460PS

Sharp JX-9660PS

With their 600dpi PhoenixPage PostScript-compatible output, Sharp's 8ppm JX-9660PS and 6ppm JX-9460PS are designed for small businesses that want high-quality printing at a low cost. At 2M, desktop publishers may find them a little underpowered; we had to add a 4M memory board in order to complete our Graphics Speed test.

The JX-9660PS (\$3199 recommended retail, \$2,990 street), comes with two 250-sheet paper cassettes and 2M of RAM. Its slower sibling, the single-cassette JX-9460PS, retails for \$2245 (about \$2045 street). Small offices will like both models' built-in PCL 5 emulation, paper trays that pop out at the touch of a button, and automatic US Energy Star-compliant sleep mode. Both models fill only 1.3 square feet of desk space.

For buyers who do not insist on PostScript, both models are available in base configurations. The base model JX-9460 costs \$1,595 retail, \$1,395 street, while the base model JX-9660 sells for \$2,799 retail and \$2,100 on the street.

Installation is somewhat complex with these Sharp lasers, involving a separate conductor cartridge and toner kit, and we found the printers' LCD menus a little difficult to navigate.

Text output for both PostScript models was faster than rated: 8.1ppm for the JX-9660PS and 6.7ppm for the JX-9460PS. Graphics performance was less impressive: 0.8 graphics pages per minute at 300dpi, 0.3gppm at 600dpi for the JX-

9660PS and the JX-9460PS. Graphics output was impressive for its subtle shading. Both models come with the standard 35 PostScript fonts and 27 PCL 5 fonts, and a slot for a proprietary font card lets you add HP-compatible bitmap or scalable fonts. Automatic emulation switching between PostScript and PCL 5 requires at least 3M in the printer.

The built-in 500-sheet capacity of the JX-9660PS is exceptional for desktop laser printers, and either of the two 250-sheet cassettes can be replaced with optional cassettes, such as a 20-envelope tray. The same optional cassettes can replace the single 250-sheet cassette in the JX-9460PS. In both models, a manual feed slot handles transparencies and single envelopes.

Desktop publishers may prefer models with resolution enhancement and genuine Adobe PostScript, but business users will find both Sharp models compact, convenient and economical.

Sharp also distributes in Australia the 6ppm JX-9400 laser, and its peripherals (trays and so on) are compatible with the JX-9460PS and JX-9660PS. It retails for \$1195 and costs around \$1050 on the street. Sharp's line-up comes with a 12-month return-to-base warranty. For more details, contact the company on (02) 831 9111.

Edward Mendelson

TI microWriter PS23

TI microLaser 600

TI microLaser Pro 600 PS23

TI microLaser Power Pro

Texas Instruments continues to build competitively priced Adobe PostScript printers that do not skimp on features or performance. This year's selection ranges from a 5ppm personal laser printer to a 12ppm workgroup model.

Only the easy-to-operate TI microWriter PS23, the baby of the bunch, uses

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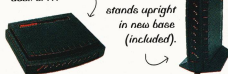
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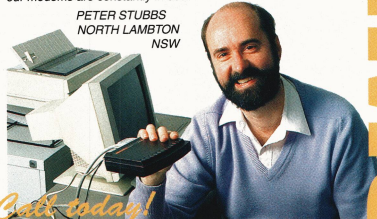
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Personal/Workgroup Lasers

In alphabetical order by company ● = YES ○ = NO	Apple Laser Writer Select 360	Brother HL-631	Canon LBP 4i	Citih CI-44 Little Laser	DEC Laser 1800	DEC Laser 51
List price (base configuration)	\$2,795	\$999	\$1,295	\$799	\$1,651	\$3,194
Dimensions (HWD in cm)	20 by 38.1 by 46.5	18.3 by 36.6 by 38.3	15.5 by 36.8 by 38.1	17.5 by 35.8 by 28.7	22.6 by 35.8 by 45.5	29.7 by 41.7 by 40.4
Weight (kg)	11.7	7.5	8.1	5	8.5	17
Engine type/Rated speed (pages per minute)	Laser/10	Laser/6	Laser/4	Laser/4	Laser/6	Laser/8
Engine model	Fuji Xerox P1	Brother HL-630	Canon LBP-PX	TEC LB-1000	Minolta SP6X	Canon LBP-EX
Processor	16-MHz AMD 29200/16	16-MHz Motorola 68000	16-MHz National Semiconductor NS32CG16/16	N/A	16-MHz AMD 29200	20-MHz Intel i960-KA
Instruction set	RISC	CISC	RISC	N/A	RISC	RISC
Standard/maximum RAM	7M; 16M	0.5M; 2M	1M; 5M	0.1M	1M; 5M	6M; 66M

Interfaces

Parallel/serial port	● ●	● Optional	● ○	● ○	● ●	● ●
Bidirectional/ECP parallel support	● ●	● ○	○ ○	● ○	● ○	● ●
LocalTalk/SCSI port	● ○	○ ○	○ ○	○ ○	○ ○	● ○
Automatic interface switching	●	●	○	○	●	●
Simultaneously active ports	●	●	○	○	●	●

Paper Handling

Capacity of each standard cassette (sheets)	250 (letter); 50 (multipurpose)	200 (adjustable: holds sizes from 3 x 5 in to 8.5 x 14 in)	100 (multipurpose)	100 (multipurpose)	150 (multipurpose)	250 (letter); 100 (multipurpose)
Duplexing/Prints on A3-size paper	○ ○	○ ○	○ ○	○ ○	○ ○	○ ○

Fonts and Features

Automatic emulation switching	●	●	○	○	●	●
PCL support	PCL 5	PCL 4	PCL 5	PCL 4 (optional)	PCL 5	PCL 5e
Maximum resolution in PCL (dpi)	300 by 300	300 by 300	300 by 300	300 by 300	300 by 300	600 by 600
PostScript support	Adobe Level 2	N/A	N/A	Level 1 clone (optional)	N/A	Adobe Level 2
Maximum resolution in PostScript (dpi)	600 by 600	N/A	N/A	300 by 300	N/A	600 by 600
Number of Type 1 fonts	35	N/A	N/A	N/A	N/A	73
Other emulations	None	Epson FX-850; IBM Proprinter XL	None	None	Epson FX-850; IBM Proprinter, XL 24E	DEC PPL3, REG (optional), Tektronix 4010 and 4014 (optional)
GDI support	○	●	○	●	○	○
Maximum resolution (dpi)	N/A	300 by 300	N/A	300 by 300	N/A	N/A
TrueType rasterizer in firmware	●	○	○	○	○	●
Resolution enhancement	●	○	●	Optional	●	●

Network Support

Internal Ethernet/Token-Ring	○ ○	○ ○	○ ○	○ ○	○ ○	Optional ○
Remote status messages	○ *	○	○	○ *	○ *	○
Remote paper-tray selection	○	○	○	○	○ *	●
Remote configuration/troubleshooting	○ * ○ *	○ ○	○ ○	○ ○	○ ○	○ ○
Remote modification of control panel by end user/administrator	○ ○	○ ○	○ ○	○ * ○	○ ○	● ○
Warranty	1 year	1 year	1 year	3 year	1 year	1 year

N/A - Not applicable: The product does not have this feature.

* This feature is available in a single-user configuration only.

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on LaserJet 4L	HP LaserJet 4L	HP LaserJet 4P	HP LaserJet 4 Plus	HP LaserJet 4M Plus
59	\$1,435	\$1,944	\$3,472	\$4,336
by 36.8 by	16.5 by 36.8 by 35.6	17.3 by 37.3 by 39.1	29.7 by 42.1 by 40.4	29.7 by 42.1 by 40.4
	7.2	9	16.6	16.6
r/6	Laser/4	Laser/4	Laser/12	Laser/12
lta SP-6XH	Canon PX	Canon PXII	Canon EX	Canon EX
MHz Fujitsu rLite 86930	16-MHz Motorola 68000	25-MHz Intel i960	25-MHz Intel i80960	25-MHz Intel i960
C	CISC	RISC	RISC	RISC
64M	1M;2M	6M;22M	2M;66M	6M;38M

●	● ○	● ●	● ●	● ●
○	● ○	● ○	● ○	● ○
Optional ○	○	○ ○	Optional ○	● ○
	○	●	●	●
	○	●	●	●

0 (multipurpose)	100 (multipurpose)	250 (multipurpose)	250 (letter); 100 (multipurpose)	250 (letter); 100 (multipurpose)
○	○ ○	○ ○	Optional ○	Optional ○

5e	○	●	●	●
by 600	PCL 5	PCL 5e	PCL 5e	PCL 5e
el 2 (clone tional)	300 by 300	600 by 600	600 by 600	600 by 600
by 600	N/A	Adobe Level 2 (optional)	Adobe Level 2	Adobe Level 2
	N/A	600 by 600	600 by 600	600 by 600
	N/A	45	35	35
on ESC/P2, on FX series, on GL/2	HPGL	HPGL	HPGL/2	HPGL/2
	○	○	○	○
A	N/A	N/A	N/A	N/A
	○	●	Optional	●
	●	●	●	●

Optional ○	Optional Optional	Optional Optional	Optional Optional	1 1
	●	●	●	●
	●	●	●	●
○	● ●	● ●	● ●	● ●
○	● ●	● ●	● ●	● ●
year	1 year	1 year	1 year	1 year

Personal/Workgroup Lasers

In alphabetical order by company ● = YES ○ = NO	HP Color LaserJet	Lexmark LaserPrinter 4037 5E	Lexmark Winwriter 600	Lexmark LaserPrinter 4039 12R Plus	Lexmark LaserPrinter 4039 12L Plus	Mannesman Tally T9008	Okidata OL400e
List price (base configuration)	\$13,520	\$1,342	\$2,236	\$3,426	\$4,537	\$2,865	\$1,390
Dimensions (HWD; in cm)	37.6 by 62 by 49	24.6 by 38 by 44.7	31.5 by 50.5 by 53	30 by 37.8 by 53.3	40.6 by 37.8 by 53.3	28.4 by 39.4 by 36.8	16 by 32 by 16
Weight (kg)	46	13.5	15.5	18	20.7	17	7.6
Engine type/Rated speed (pages per minute)	Laser/10	LED/5	Laser/8	Laser/12	Laser/12	Laser/8	LED/4
Engine model	Proprietary (Konica)	Lexmark 4037	Lexmark 4029	Lexmark 4039	Lexmark 4039	TEC LB 3500	OKI OL400e
Processor	20MHz AMD 29030	16MHz Motorola 68000	16.7MHz Motorola 68000	16MHz AMD 29200	16MHz AMD 29200	20MHz Intel i80960KA 32 bit	16MHz Motorola 68000
Instruction set	RISC	CISC	CISC	RISC	RISC	RISC	RISC
Standard/maximum RAM	8M;72M	512K;4.5M	2M;8M	2M;16M	4M;16M	2M;32M	512K;4.5M
Interfaces							
Parallel/serial port	● Optional	● Optional	●●	●●	●●	●●	●●
Bidirectional/ECP parallel support	● ○	● ○	● ○	● ○	● ○	● ○	○ ○
LocalTalk/SCSI port	Optional ○	○ ○	○ ○	Optional ○	Optional ○	Optional ○	○ ○
Automatic interface switching	●	○	●	●	●	●	●
Simultaneously active ports	●	●	○	●	●	●	●
Paper Handling							
Capacity of each standard cassette (sheets)	250 (letter)	150 (multipurpose); 1 (envelope)	200 (letter)	200 (letter)	500 (letter)	250 (letter; A4 or legal); 100 (multipurpose)	100 (univers. letter)
Duplexing/Prints on A3-size paper	○ ●	○ ○	○ ○	Optional ○	Optional ○	○ ○	○ ○
Fonts and Features							
Automatic emulation switching	Optional	●	●	●	●	●	○
PCL support	Enhanced PCL 5	PCL 4	PCL 4	PCL 5e	PCL 5e	PCL 5e	PCL 4.5
Maximum resolution in PCL (dpi)	300 by 300	300 by 300	300 by 300	600 by 600	600 by 600	600 by 600	300 by 300
PostScript support	Adobe Level 2 (optional)	N/A	N/A	Level 2 clone	Level 2 clone	Level 2 clone (optional)	N/A
Maximum resolution in PostScript (dpi)	300 by 300	N/A	N/A	600 by 600	600 by 600	600 by 600	N/A
Number of Type 1 fonts	35	N/A	N/A	39	39	35	N/A
Other emulations	None	IBM LaserPrinter 4019 and 4029; IBM Proprinter	None	None	None	None	None
GDI support	○	○	●	●	●	○	○
Maximum resolution (dpi)	N/A	N/A	600 by 600	600 by 600	600 by 600	N/A	N/A
TrueType rasterizer in firmware	●	●	●	●	●	●	○
Resolution enhancement	●	●	●	●	●	●	○
Network Support							
Internal Ethernet/Token-Ring	Optional Optional	○ ○	N/A	Optional Optional	Optional Optional	Optional Optional	○ ○
Remote status messages	●	○	○*	●	●	●	○
Remote paper-tray selection	●	○	○*	●	●	●	○
Remote configuration/troubleshooting	● ●	○ ○	○* ○*	● ●	● ●	● ●	○ ○
Remote modification of control panel by end user/administrator	● ●	○ ○	○* ○*	● ●	● ●	○ ●	○ ○
Warranty	1 year	1 year	1 year	1 year	1 year	1 year	1 year

N/A - Not applicable. The product does not have this feature.

* This feature is available in a single-user configuration only.

Model	Panasonic SideWriter KX-P4400	QMS 1060 Print System	QMS magicolor	Sharp JX-9460PS	Sharp JX-9660
Price	\$789	\$5,197	\$26,614	\$2,245	\$3,199
Resolution	29.7 by 12.7 by 38	36.3 by 41.1 by 48	37 by 52 by 56.4	29.2 by 33 by 36.6	32.5 by 33 by 36.6
Print Speed	6.5	16.8	38.7	12	14.4
Interface	LED/4	Laser/10	Laser/8	Laser/6	Laser/8
Processor	Intel 486	Information not provided	Hitachi proprietary	Sharp 9460	Sharp JX-9660
Memory	16MHz MIPS 100	16MHz National Semiconductor NS32CG16	20MHz IDT 9081	33MHz Intel 80960CF	16MHz AMD AM29005
Capacity	CISC	RISC	RISC	RISC	RISC
Media	5M	1M; 5M	8M; 64M	12M; 64M	2M; 9M
Options	● Optional	●●	●●	● Optional	●●
Parallel	○ ○	●●	●○	○ ○	○ ○
Serial	Optional ○	● Optional	●●	Optional ○	● ○
PostScript	○	●	●	●	●
Other	○	●	●	●	●
Capacity (universal)	100 (multipurpose)	500 (letter); 150 (multipurpose)	250 (multipurpose)	250 (multipurpose)	250 (letter); 250 (letter)
Capacity	○ ○	○ ○	○ ○	○ ○	○ ○
Capacity	○	●	●	Optional	Optional
Capacity	PCL 4	PCL 5	PCL 5C	PCL 5	PCL 5
Capacity	300 by 300	300 by 300	300 by 300	300 by 300	300 by 300
Capacity	N/A	Level 2 clone	Level 2 clone	Level 1 clone	Level 1 clone
Capacity	N/A	600 by 600	600 by 600	600 by 600	600 by 600
Capacity	N/A	39	65	13	13
Capacity	None	HPGL; LINO3 Plus; (optional) QUIC 2 (optional)	DECNet (optional), LINO3 Plus	Epson FX-80; IBM Graphics Printer; IBM Proprietary	Epson FX-80; IBM Graphics Printer; IBM Proprietary
Capacity	○	○	○	○	○
Capacity	N/A	N/A	N/A	N/A	N/A
Capacity	○	●	●	○	○
Capacity	○	○	○	●	●
Capacity	○ ○	Optional Optional	Optional Optional	○ ○	○ ○
Capacity	○*	●	●	○	○
Capacity	○	●	●	○*	○*
Capacity	○ ○	●●	●●	○ ○	○ ○
Capacity	○ ○	●●	●●	○ ○	○ ○
Warranty	1 year	1 year	1 year	1 year	1 year

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Personal/Workgroup Lasers

In alphabetical order by company ● = YES ○ = NO	TI microWriter P523	TI microLaser 600	TI microLaser Pro 600 P523	TI microLaser Power Pro	Xerox AP3ps	Xerox AP10ps	Xerox 4900 Color Laser Printer
List price (base configuration)	\$1,582	\$1,943	\$2,897	N/S	\$2,899	\$4,071	\$15,170
Dimensions (HWD; in cm)	26.4 by 35 by 37.6	26.4 by 35 by 37.6	32.5 by 33 by 36.6	32.5 by 33 by 36.6	25 by 35.3 by 39.4	25 by 35.3 by 39.4	38.1 by 60.9 by 55.1
Weight (kg)	14.8	14.8	14.4	14.4	14	14	48.6
Engine type/Rated speed (pages per minute)	LED/5	Laser/5	Laser/8	Laser/12	Laser/5	Laser/10	Laser/12
Engine model	Samsung SL 1050	Samsung SL 1050	Sharp JX-9600	Sharp JX-9612	Fuji Xerox XP-5	Fuji Xerox XP-10	Hitachi Color Engine
Processor	16-MHz Motorola 68000	16-MHz IDT 3041	20-MHz IDT 3041	25-MHz IDT 3041	16-MHz AMD 29200	20-MHz AMD 29200	25-MHz AMD 29030
Instruction set	CISC	RISC	RISC	RISC	RISC	RISC	RISC
Standard/maximum RAM	2M; 4.5M	2M; 10M	6M; 22M	6M; 22M	6M; 16M	6M; 16M	12M; 48M
Interfaces							
Parallel/serial port	● Optional	● Optional	● Optional	● Optional	● ●	● ●	● ●
Bidirectional/ECP parallel support	● ○	● ●	● ●	● ●	● ○	● ○	● ○
LocalTalk/SCSI port	○ ○	● Optional	● Optional	● Optional	Optional ○	Optional ○	● ○
Automatic interface switching	○	●	●	●	●	●	●
Simultaneously active ports	○	●	●	●	●	●	●
Paper Handling							
Capacity of each standard cassette (sheets)	250 (letter)	250 (letter)	250 (letter), 250 (letter)	250 (letter), 250 (letter)	200 (letter), 50 (multipurpose)	250 (letter), 50 (multipurpose)	250 (multipurpose)
Duplexing/Prints on A3-size paper	○ ○	○ ○	○ ○	○ ○	○ ○	○ ○	○ ○
Fonts and Features							
Automatic emulation switching	●	●	●	●	●	●	●
PCL support	PCL 4	PCL 5	PCL 5	PCL 5	PCL 5e	PCL 5e	PCL 5
Maximum resolution in PCL (dpi)	300 by 300	300 by 300	300 by 300	300 by 300	600 by 600	600 by 600	300 by 300
PostScript support	Adobe Level 1	Adobe Level 2	Adobe Level 2	Adobe Level 2	Adobe Level 2	Adobe Level 2	Adobe Level 2
Maximum resolution in PostScript (dpi)	300 by 300	600 by 600	600 by 600	600 by 600	600 by 600	600 by 600	1200 by 300* *
Number of Type 1 fonts	23	23	23	65	35	35	35
Other emulations	Diablo 630; Epson FX series; IBM	None	None	None	None	None	None
GDI support	○	○	○	○	○	○	○
Maximum resolution (dpi)	N/A	N/A	N/A	N/A	N/A	N/A	N/A
TrueType rasterizer in firmware	○	●	○	●	●	●	●
Resolution enhancement	○	○	○	○	●	●	●
Network Support							
Internal Ethernet/Token-Ring	○ ○	○ ○	Optional ○	Optional ○	Optional Optional	Optional Optional	Optional Optional
Remote status messages	○	○ *	○	○	●	●	●
Remote paper-tray selection	○	○ *	○	○	●	●	●
Remote configuration/troubleshooting	○ ○	○ ○	○ ○	○ ○	● ●	● ●	● ●
Remote modification of control panel by end user/administrator	○ ○	○ ○ *	○ ○	○ ○	● ●	● ●	● ●
Warranty	1 year	1 year	1 year	1 year	1 year	1 year	90 days; extensions are available

N/A - Not applicable; The product does not have this feature
* This feature is available in a single-user configuration only.

* * The maximum resolution requires additional RAM.
N/S - Not specified at press time.

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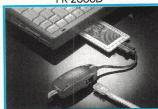
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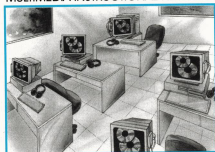
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on their Steeplechase battery life test. The results? Well let's just say it absolutely blitzed the existing records".

As VeriTest themselves said "...the XP's battery life is an order of magnitude ahead of the market".

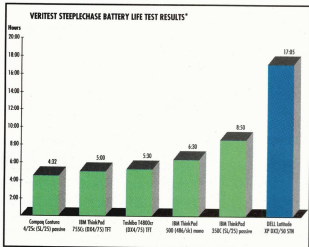
But we wouldn't recommend that you invest in a new notebook on the strength of battery life alone. That's why there are a host of features that are just as impressive.

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Well fairly compelling reasons for you to choose a new Dell Latitude XP notebook. But we've yet to play our trump card. Compare our prices and call us.

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A black Dell Latitude laptop is shown open, displaying the Dell logo and the phone number 008 812 392 on its screen. The laptop has a keyboard and a trackball.

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*The VeriTest Steeplechase battery life test includes mechanical typing, pausing, task switching and printing in MS Windows v3.1, MS Word for Windows v6.0 and MS Excel v5.0. All numbers represent an average of at least two trials with power management function enabled. Test simulates executive usage, ie carrying notebook between meetings and intermittent use. Competitor's times are published in Portable Computing Magazine (U.S.A.). For a complete copy of the VeriTest results call the number shown. Dell 3 year limited warranty includes 1 year next business day on site parts and labour for system and components (Not available in certain remote areas). Second and third year parts warranty excludes monitor. *Sales tax included. Delivery not included in price. Corporate discounts not available on some configurations. Prices and specifications are subject to change without notice. On site service warranty may not be available in certain remote areas. The Intel Inside Logo is a trademark of Intel Corporation. Latitude is a trademark of Dell Computer Corporation.

an LED array instead of a laser for imaging. The 300dpi, 5ppm engine provides crisp, dark text and graphics at above-average speed. PCL 4 comes standard in the base model, which retails at \$1,128 (\$1,000 street price); with the PostScript upgrade option with 23 fonts the printer sells for \$1,582, with 65 fonts, \$1,850.

The TI microLaser 600 (which sells for \$1,943) reduces the control panel to one button, and gives over printer configuration and control functions to DOS and Windows utilities. Resolution jumps to 600dpi in PostScript, sharpening image details and improving greyscale range. Parallel and AppleTalk connections and PCL 5 and PostScript Level 2 emulations are standard. The under-\$2000 street price should make this an attractive choice. As we were compiling this report, we learned that the shipping date for the microLaser 600 moved to November 1994.

The \$2,897 TI microLaser Pro 600 PS23 boasts rated speed to 8ppm, and actually prints text in PostScript a little bit faster than rated. PostScript graphics performance at 600dpi was excellent at 1.1 graphics pages per minute on our Graphics Speed test and 1.3ppm on our CorelDRAW test. Print quality was equivalent to the microLaser 600. An accelerator option provides a significant boost for PostScript graphics printing — about 50% faster for both 300 and 600dpi images.

For this review we also put to the test the new top-of-the-line TI microLaser Power Pro, which adds a 12ppm laser print engine, making it more competitive with the latest HPs. This product will ship shortly; prices were not available at press time.

Xerox's AP5ps and AP10ps come with an Australian designed and developed PostScript called PacScript.

We include the test results on this printer to allow readers to make a comparison against its competitors.

Texas Instruments' Ethernet adapter can turn the microLaser Power Pro or microLaser Pro 600 into its own print server. It took less than 10 minutes to install Ethernet hardware and software and print over the network. A DOS Printset utility monitors network printing but little remote management capability is offered.

The microLaser Power Pro's text speed times were even faster than its 12ppm rating. The unit's PostScript graphics speeds and its times on the PostScript portion of our Windows applications tests were faster than average for its class. In

Texas Instruments' Ethernet adapter can turn the microlaser Power Pro or microLaser Pro 600 into its own print server.

addition, the built-in complement of 65 PostScript microlaser Power Pro will appeal to individuals or small workgroups.

Texas Instruments printers come with a worldwide, one-year return-to-base warranty. The company can be contacted on 008 024 853.

Alfred Poor

Xerox AP5ps

Xerox AP10ps

Xerox 4900 Color Laser Printer

Xerox offers two price-competitive 600dpi workgroup lasers and an innovative colour Laser Printer. At \$2,899 the Xerox AP5ps turns out 5ppm and has a 10,000-page duty cycle. If you don't need PostScript, the 4505 with only PCL 5e retails for \$1,969 (around \$1,850 on the street). At \$4,071 the sturdy Xerox AP10ps doubles the page rate and the duty cycle. Without PostScript, the AP10 retails for \$3,415 (\$3,190 street).

The Xerox 4900 Colour Laser Printer, which retails at \$15,170, is rated at 12 monochrome ppm and 3 colour ppm, offers Xerox-patented Quad Dot Printing, which smooths colour dithering patterns. It also offers up to 1200 by 300dpi resolution (with a 16M RAM upgrade) in Post-

Script 5e and PostScript. On the unit we tested, the Graphics Speed test scores were respectable at 1.5 graphics pages per minute in PCL and 0.9ppm in PostScript. Graphics print quality was superb.

With the help of a faster XP-10 engine, tests on the review unit found that the AP10ps almost doubles 300dpi text speeds to 9.7ppm in PCL 5, 9.5ppm in PostScript. Graphics speeds at 600dpi moved up to 1.4ppm in PCL, 1.1ppm in PostScript. Both units we tested came with 6M of RAM, however the AP5 comes standard with 2M.

Based on a Hitachi colour engine and 25MHz AMD 29030 RISC processor, the 4900 brings plain-paper colour/monochrome printing to the small office. On our 300dpi colour tests the 4900 produced bright colours but dithering was noticeable and the registration was a little bit off in printing process black. On our 1200 by 300dpi colour print tests, the 4900 fared very well, with bright, saturated colours and no noticeable dithering, but the registration was still a little off in composite black text. Xerox officials say that the company's Quad Dot Printing technology should solve any niggly points we found, so check this on the printer before you buy.

The unit's cost per colour page is on the high side at around 37 cents for 5% coverage of black, cyan, magenta, and yellow (total 20%) when compared with the magicolor's 30 cents and HP Color LaserJet's 16 cents.

The 4900's 300dpi monochrome mode, which was rated at 12ppm, printed PCL text at 8.2ppm, PostScript graphic at 0.6ppm. At rated speeds of 6ppm in two-colour mode and 3ppm in full colour, the 4900's text speed dropped proportionately, but monochrome graphics speed hovered at around 0.56ppm.

The 4900 we tested came complete with 24M of RAM and the optional Media Server kit, which lets you print pure PCL 5 and PostScript files from a floppy disk drive built into the front of the case.

Xerox also recently released an A3 laser printer rated at 8ppm and 600dpi — called the AP8, it retails for \$3995. Xerox's AP line of printers come with a 12-month return-to-base warranty, while the 4900 Color Laser comes with a three-month onsite warranty with ongoing options. Xerox inquiries can be directed to 13 14 12.

Bruce Brown ▲

Home *and* Away

APC puts remote access solutions under the spotlight to discover leaving the comforts of the office behind is no longer necessary.

BY BEN GERHOLT

According to IDC, 99,000 notebooks were sold in 1993 through dealer channels. The first half of 1994 saw 68,000 units through those same channels. The rising popularity of notebook computing is clear, but its impact on business computing isn't fully understood. Notebooks should enable employees to take their most useful tools on the road. Increasingly, however, these tools aren't standalone productivity applications, but rather network applications and group information stores, and no road warrior's kit bag is complete without access to them.

While the notebook made portable computing commonplace, increasing reliance on the collaborative computing services offered by the corporate network has made the extension of those services to a growing horde of notebook users not just impressive gadgetry but a necessity of modern networking.

In the US, an impressive range of companies have trialed moving workers out of offices into their homes while providing them with the technology required to maintain an active and productive work role. Companies have the opportunity to improve conditions for their workers and save money on valuable office space and ancillary services.

The US Government has even introduced legislation requiring companies to reduce employee travel requirements during peak times—telecommuting is an obvious solution, and certainly may be

far easier than staggering workforce hours.

Traditional remote access devices have been divided into three market sectors: email, remote control, and remote node access. The new generation of remote services includes full workflow access through technologies such as advanced messaging, client/server databases and Lotus Notes—still in a class of its own since its inception in 1989.

The traditional systems arose from a need to access specific services or files, rather than from a requirement for integrated team workflow design.

As a general rule, performance over ordinary phone lines, while suitable for small to medium-sized file transfers, store-and-forward messaging and replication, is far from ideal for real-time interactive work. This makes the use of advanced offline workgroup tools more productive than online devices. Nevertheless, online connections are useful for unavoidable file transfers and, perhaps most importantly, remote administration.

Messaging and electronic mail

Store-and-forward messaging technology provides an ideal architecture for remote users. As the name suggests, messages are stored until they can be forwarded to their destination. Messages from the home message database, or post office (PO), addressed to the remote user must wait until the user connects and

requests the messages be sent. Messages destined for addressees not directly connected to the home PO may have to travel in a number of hops. As each hop is reached, the message must be stored temporarily in that new location until it can be passed to the next hop when the system is connected.

A good example of the hop scenario is a hypothetical message from a remote office in NSW destined for a PO in Scotland. The first step on the journey would be the transfer to the Sydney office by modem link. The remote configuration may be scheduled to call head office during the middle of the night, or when five messages are waiting to be transferred, or when a user deliberately marks a message as urgent. Once our message has reached Sydney, it is ready to start on its journey to the UK office located, shall we say, in London. As our organisation is a large firm it has a WAN that links London to Australia. Mail is then transferred across the WAN every five minutes to the London PO. Once our message has reached London, it makes a further WAN connection to Scotland and delivers the message. To stretch the journey another step, it may be delivered across a modem link to a home office worker logging into the Scottish PO.

Store-and-forward messaging is not limited to enterprise networks, however. Most mail systems can translate messages between themselves well, allowing a huge range of mail systems to be connected to each other by commercial providers or the Internet. This will allow remote users a range of options when searching for a suitable mail system.

Importantly, messaging is no longer just about sending text-based e-mail. Rich text, document embedding, hypertext and multimedia data still require higher bandwidth by degrees than simple text. More advanced features like the integrated collection of mail, voice and fax messaging into a centralised inbox or message centre

is possible. Faxes can also be sent via messaging systems, although be alert when using commercial providers as many distribute their faxes from a central location making a fax to a friend five minutes

is then supported in its native format and, if your enterprise is connected to the CompuServe's cc:Mail gateway (the CIS hub) you are only one hop from your enterprise e-mail system. In effect,

The use of replication techniques enables a Notes remote user to maintain up-to-date project data

away an international call. This is one area that commercial providers need to endeavour to improve, because faxes will certainly be with us for some time yet.

Remote users can use store-and-forward messaging to work offline and send and receive messages *en masse*. Connection costs are limited to the file transfer time, and the frustration of using online messaging systems over slow communication links is eradicated. Even low quality phone lines have little effect — set off your send/receive batch at a lower speed, and make a coffee. By the time you return, your new mail will be waiting in your inbox and your connect software will have already disconnected the modem. Scheduling even allows you to fully automate your mail updates to connect at the cheapest or most suitable times.

For those constantly on the move across the country and even throughout the world, it is possible to use a service provider that has localised dial-up stations to save call costs. Remote employees may also find this more useful than connecting directly to the enterprise system. CompuServe even offers support for cc:Mail. Users set up an account on CompuServe's cc:Mail PO using their CIS user ID. cc:Mail

CompuServe becomes your worldwide cc:Mail network. The example given earlier could have CompuServe replace the WAN link to the UK with offices at either end dialling up local CompuServe nodes on a regular basis. This would also allow other companies interconnected to the system through MCIMail, the Internet and so on to contact the company.

Connecting the PO to a service such as this allows messages to travel to other enterprises, and it has the potential to revolutionise the way you do business and even save a fortune on long-distance and international phone calls.

There are disadvantages to both systems for remote users. The enterprise mail gateway may crash and you won't be able to connect — it is a wise move to configure a second gateway that you can access, even if at slower speeds and preferably at another physical location. Commercial providers also cost money and sometimes free lines will be unavailable, especially at peak times. Even as I am writing this I have been trying to call up CompuServe with no luck.

The future of messaging probably rests on the use of a universal mail client. Windows95 will use Microsoft's Messaging API

(MAPI) to offer a universal email client that will allow the integration of diverse messaging applications and back-end services. MAPI support will be offered on systems including MS Mail, Novell MHS, CompuServe and the Internet. MAPI-compliant systems will allow message routing via a standard interface, and provide address books for more than one messaging system. MAPI will reserve support for store-and-forward if systems are temporarily unreachable.

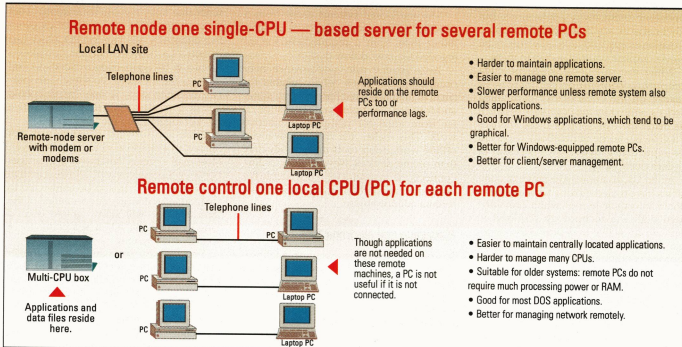
Lotus Development's approach to standardising the messaging interface has been to develop the Vendor Independent Messaging (VIM) interface currently used on Notes and cc:Mail. Lotus is developing a VIM over MAPI layer so developers will only have to design to one interface.

Replication and groupware

Groupware, and its main proponent platform Lotus Notes, offers users the ability to participate in collaborative workflow.

This system is apposite to remote users — the use of replication techniques enables a Notes remote user to maintain up-to-date project data. The remote user works locally on their own copy of the Notes application. As with store-and-forward messaging, the speed of data transfer is not critical — although when transferring across long-distance lines, hardware costs are outweighed by the additional call costs. In addition to phone lines, notes replication works over wireless and WAN connections.

Remote users can set Notes to make scheduled connections — allowing unas-



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sisted calls to be made during off-peak times or just before the latest information is required. Notes also doesn't waste valuable connect time transferring data already present on both systems—only alterations are exchanged.

With faster modems (9600bps at least) it is also possible to work online with server databases. While obviously not as quick as local databases, thanks to Notes' client/server topology accessing these databases is still very viable.

Windows95 will offer a universal email client that will allow the integration of diverse messaging applications and back-end services.

When a document is worked on by more than one person at the same time, Notes uses the most up-to-date version whilst still saving the conflicting version as a response document attached to the original. As the leading groupware application, Notes offers sophisticated workgroup computing for remote users and is ideal for group projects with people irrespective of their location.

Remote control software

Remote control software allows you to connect and take control of another PC whether it be across the office on the LAN or over the phone line with a modem. The controlled PC can then be operated as if you are seated in front of it—applications can be run all without having to transfer reams of data across the connection.

Of course, remote control software also allows you to transfer files from the PC under your control to your local PC. With remote control software that supports the LAN, you can do anything on the network that you do at the office.

Most remote control software also allows you to take control of a PC across the network, rather than just across the phone line. This allows administrators to fix machines without leaving their own IT hideaway, and this can be combined with remote node access to enable remote node users to run procedures directly on the LAN.

Controlling PCs remotely is a completely online task so it requires fast modems to guarantee reasonable performance. If you intend relying on your remote control PC for critical mobile-user business tasks, many variables could prevent you from connecting. Phone lines may be noisy, someone may have used your machine and not reloaded the remote control drivers, or a benign workmate who didn't know better switched off the box to save power.

Generally remote control packages are installed and managed by users them-

selves and there is no guarantee that rigid security specifications, designed and adhered to by network staff, are followed by the individuals concerned. Administrators might get around this by various means: offering remote node/control combinations or keeping remote control PCs under lock and key. It is still an administratively intense process with the potential to erode valuable time.

Security features are integrated into most systems in the form of password and call-

back utilities. Call-back systems provide another incentive for users, especially those a long-distance call away from the device; work foots the bill. Call-back systems don't have to be configured purely for security, they could be configured to call the number the user enters on initial connect. Many products also have the ability to lock the host to prevent tampering.

Directory synchronisation is one feature similar in concept to groupware replication. Some packages—including CoSession—support systems for transferring new and updated files between specified directories on the host and the remote node. This allows relatively painless version control and saves time online through automation of file transfers.

Quite a few remote control products are available. Notable amongst these are Norton pcANYWHERE, Carbon Copy, Close Up, CoSession, PolyPM/2 and, the new release of LapLink reviewed in this month's First Looks section. Of these examples, all are DOS/Windows-based except for PolyPM/2 which runs on OS/2 and can control OS/2, DOS and Windows machines across both the phone and LAN.

Remote control software was originally limited to text-based work for acceptable speeds. Now programs like pcANYWHERE send screen redraw information, rather than the actual video output, in a codified form, reducing the information to be transferred for improved performance.

Remote node access

Working remotely as a node on your network is as close as you can get to being in the office. Access to the system is identical to your work configuration—the difference is in the speed of your file transfers and the fact that the coffee tastes better.

Remote node servers and access software allow remote users to become an actual node on the LAN, albeit with only a fraction of the performance. Only the

user's rights will limit the access available. While these systems are sometimes complex to configure, once they are set up there are few problems.

While the remote node user can technically use any facility available when attached locally to the network, there are many pitfalls to avoid. Executables located on the server take an eternity to run. You have to run your executables from a local drive. Keep all executables, not just applications, on the remote PC including LAN login software and any other network utilities you use. This will result in your bandwidth being maximised for data. If you are intending prolonged remote work, consider using an ISDN line for increased bandwidth.

Remote node access is particularly suited to client/server applications. Company reps, out on the road, can keep an eye on stock levels and place orders through a centralised client/server database. Performance on this type of system is fair as processing is carried out at the server and information needed has to be transferred.

Microsoft Windows NT Server version 3.5 includes Remote Access Services (RAS) and will support up to 256 sessions. The dial-up server can also act as a gateway to Unix and NetWare servers and will support both SLIP and PPP connections. Windows for Workgroups 3.11 includes RAS client software. Windows 95 and Windows NT Workstation will include both PPP and SLIP connections.

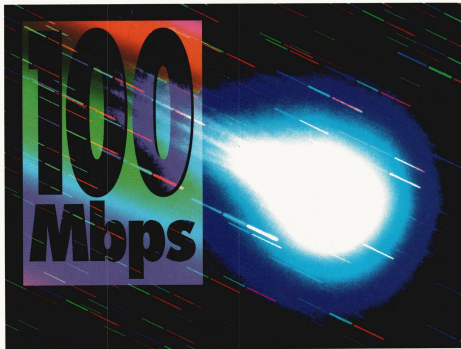
Remote node servers provide an all-in-one solution to remote access to your network. A server will usually support the majority of protocols including IPX/SPX, TCP/IP and NetBEUI. Most provide advanced security features such as passwords separate to the NOS, call-back and calling unit identification. Administrators will find remote node servers extremely useful for small tasks that would otherwise entail inconvenient returns to the office.

Remote node servers can also provide dial-out capabilities allowing those on the network to share modems for connections to external services rather than requiring a dedicated modem. These typically work by redirecting COM ports to the remote node server. After this is done any communications package can use the server to dial-out across the LAN.

Combination remote node/remote control servers are available to provide centralised management of both areas of remote connection. While costly, these systems can use software like NetWare Connect to provide multiple I/O connections to remote users. For remote control, these servers have multiple processor boards that can be configured to automatically reboot when problems occur.▲

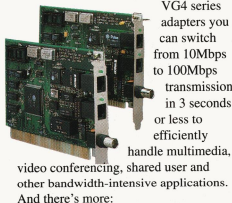
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New Complex ENET100-VG4 Series.

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VG4 series adapters you can switch from 10Mbps to 100Mbps transmission in 3 seconds or less to efficiently

handle multimedia, video conferencing, shared user and other bandwidth-intensive applications. And there's more:

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- When your network is equipped with a 100VG-AnyLAN compatible hub, you can quickly change from 10Mbps to 100Mbps transmission by simply unplugging from one RJ45 and connecting the cable to the other.
- The Complex VG1400/6 hub features 6 RJ-45 (100Mbps) ports with one uplink port for easy cascading. It is ideal for small workgroups requiring high bandwidth. Small, slim footprint design, extensive status LEDs, auto parity detection and correction for inverted cable.
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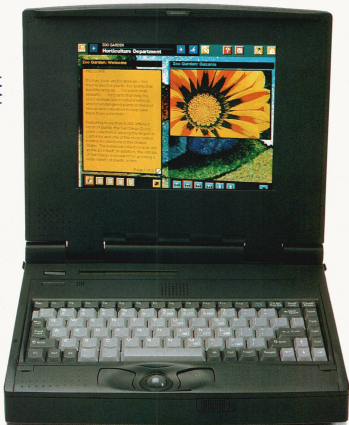
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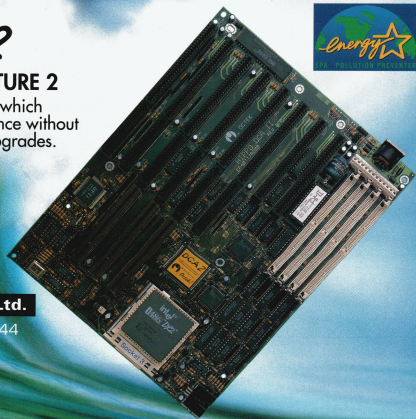


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FAULT TOLERANCE

LANshadow knows how to protect your data

BY PADRAIC BOYLE

LANshadow version 4.0 is a low-cost, software-only solution that preserves files on the server's hard disk by mirroring them to another available hard disk. LANshadow does not provide complete protection against sudden hardware failures nor all types of data loss, but it may be the ideal solution for small to medium-sized NetWare LANs that need to protect only certain files.

LANshadow comprises a NetWare Loadable Module (NLM) that runs on NetWare 3.x and 4.x servers and a Windows front-end that runs on an administrator's PC. It protects your data by periodically copying (or 'mirroring') user specified files

over all the primary server's functions in the event of a hardware failure. LANshadow maintains copies only of those files selected by the user. The program does not back up the entire server and does not switch over to the secondary server if the primary server fails.

We installed LANshadow on a NetWare 3.12 network in only a few minutes. Through the easy-to-use Windows-based management utility we selected our source server and the specific files we wanted mirrored to another disk. Once we selected the files, we were prompted for a destination drive, which can be any available NetWare volume. To complete the setup process, we designated how often we wanted our files mirrored. One nice feature: We chose to back up some of our login scripts and LANshadow scanned them for any mention of the source server, which it then replaced with the name of our destination server. This is especially handy if you include server names in your login scripts to automate users' logins.

LANshadow could hardly be called transparent to the end-user. In most cases we had to login to the destination server to get our files when the source server went down.

This could pose a problem if the network administrator doesn't include server names in the user's login scripts, because users will have to know the destination server's name. A few times we had to reboot our client to re-establish our network connection, at which point we still had to login to the destination server.

This highlights two notable drawbacks to HTI's product. First, SFT III maintains users' network connections when the switch is made to the secondary server, so

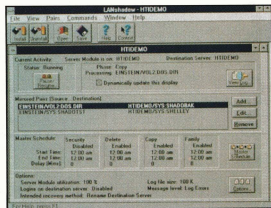
You need to protect your data, but high-end fault tolerant systems are expensive. Horizon Technologies (HTI) may have the answer.

with SFT III administrators are less likely to get calls from angry users when something untoward happens in the server room. With LANshadow, each user has to login to the network again — to a different server — when the primary server fails. This is one of the trade-offs in choosing a low-end fault tolerance solution.

Furthermore, LANshadow cannot mirror any open files or the source server's RAM. This relatively high-end feature is thus far provided only by SFT III, but when you consider that you can lose not only an entire file (such as the database you've worked on all morning without saving) but all pending print jobs waiting in the queue, as well as anything else that happens to be open or in memory, the value of such a feature becomes clear.

Still LANshadow is intended to protect only specific files from disaster at a reasonable price, and it delivers as promised. This affordable and effective package could be the low-end solution for data protection that many NetWare sites are looking for.

LANshadow 4.0
 Distributor: LAN-Net
 Phone: (02) 316 5002
 Price: First server, \$2,190; each additional server, \$870.
In short: LANshadow offers software file mirroring for NetWare LANs not requiring expensive hardware or software.



LANshadow's expanded view Window presents comprehensive information that's easily configurable.

from a source server to a destination server over LAN or WAN links. Since the destination server need not take over for the source server, the two machines do not have to be identical — as they do with NetWare System Fault Tolerance Level III (SFT III). So long as there is sufficient disk space available, any NetWare volume will suffice (even another hard drive on the same server).

Unlike SFT III which provides a complete secondary server to immediately take



The (r)evolution of the species quickens with Toshiba's 75 MHz of Pentium™ performance

In evolutionary terms the development of Toshiba's mobile computing technology has been both rapid and sustained. Now comes a leap so exciting it is tempting to call it revolutionary.

Even as the flagship of a technologically advanced range, the new T4900CT is an awe inspiring combination of power, speed, capacity and versatility.

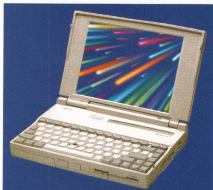
The power comes from a 75MHz Pentium™ processor operating on 3.3 volts, housed in an A4 notebook computer. It has a 16Kb cache and a built-in math co-processor to meet the performance needs of today's and tomorrow's applications while maintaining complete compatibility with all current software. Even with the extra power of the Pentium chip there are no heat problems thanks to Toshiba's ingenious "heat sink" design.

The spectacular 10.4" TFT display, the largest size on any mobile, offers 65,000 simultaneous colours to enhance any presentation or graphics design.

The massive 810Mb of hard disk drive capacity and a standard 8Mb of RAM expandable to a full

40Mb give the T4900CT the capacity to run the most data intensive programs and applications, anywhere, anytime.

It has an in-built speaker, microphone, 16 bit sound card and pre-installed Windows Sound System™. The T4900CT is fully multi-media ready accessing the CD-ROM via the optional



PCMCIA SCSI card or simply housing it in your Desk Station IV*.

There are two independent PCMCIA slots, one Type II and one Type III, to allow simultaneous use of PCMCIA options, offering maximum expandability and full "on the road" communications and connectivity.

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NEW AND IMPROVED

AST launches new Manhattan series

Over the last two months AST, the well-known US-based corporate computing company, has released a new range of servers designed to cater for all levels of the server market. The product list goes from single processor workgroup servers through to large symmetric multiprocessing (SMP) systems.

One feature is common to all machines in AST's new line up: All are based around the Pentium processor. AST claims the small price difference between 486 and Pentium CPUs justifies its departure from the 486 market.

"With the growth taking place in the application and database server segment and in client/server applications, fault tolerance, ease of installation and use, open standards and network management solutions are more important than ever before," said AST's marketing manager for Australia and New Zealand, Darren Besgrove.

AST has already released its P (Power) and V (Value) ranges offering advanced capabilities including fault tolerance. Its latest product is the G server, a mini-tower that delivers reliability and performance at a cost effective price. This unit, designed for the small to medium workgroup, features integrated PCI, Fast SCSI-2, PCI and ISA slots, up to seven drive bays and

year. Also expected in the early half of 1995 is an advanced multiprocessor server that will feature multiple hot-swappable I/O boards. For more information contact AST Computer on (02) 415 5400.

NEW

New solutions from Network

The Network Series 6000 Remote PowerBase is a three-slot version of the Series 6000 PowerBase, and is designed for integrated server, hub and router functionality at remote offices.

The PowerBase integrates what Network call a 'Network Services Engine' (NSE) — a server based on Intel's 486/66MHz CPU — into the base of the unit. This unit has five EISA and two VESA slots, and hooks directly into the backplane allowing Ethernet, Token Ring, FDDI protocols and management. IP and IPX internetworking can be provided by the ISA-based remote router that can support T1 or E1 lines or 56K modem connections.

The PowerBase sports fault tolerance in the form of dual power supplies and SNMP-compliant monitoring of the temperature, fan and power supplies. The design of the Powerframe makes it ideal for remote sites where local support cannot be provided and the operator's technical ability is limited.

The Network Series 3000 Stackable trunk hub is also being released. It combines three 10BaseFL backbone ports and a dozen 10BaseT ports. An SNMP management enabled hub will also be available that will support an entire stack of devices.

Series 3000 stackable hubs are \$5,550 and \$7,454 each for the unmanaged and managed units respectively. Series 6000 Remote PowerBase costs \$4,390 for the base unit, to which can be added \$7,114 for redundant capable chassis with single power supply and \$1,991 for the additional redundant power supply. For more information contact LANvision on (02) 417 2711.

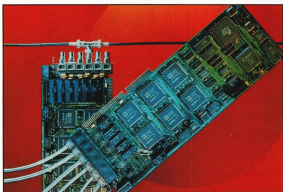
LAN Systems switching hub card

The new Xnet Series 1800 ParallelSwitch lives on a card inside servers, increasing bandwidth and throughput without the need for a high speed connection between

the server and the switch. These connections are generally achieved by the use of multiple Ethernet connections or a high speed connection at considerable cost.

In addition to the improvement in performance resulting from the card, multiple cards can be used in a machine, potentially maximising server performance. The card features full management and configuration facilities through the server and supports protocols including AppleTalk, IPX, LAT, Spanning Tree and TCP/IP.

The EISA or ISA-based card has up to six ports that can be connected to hubs for



The ParallelSwitch 1800 offers switching through the server bus without the need for high speed interconnection links.

distribution. Each unit retails for \$4,100, for more information contact LAN Systems on (02) 901 3655.

LANtastic for OS/2

Artisoft has announced a 32-bit peer-to-peer network operating system (NOS) for IBM's OS/2. The new NOS will allow OS/2 users to integrate their machines into existing DOS and Windows LANtastic networks.

OS/2 boxes will be able to connect to LANtastic versions 5.0 and 6.0 as well as LANServer, Windows for Workgroups and NT, NetWare and LAN Manager servers.

Due to OS/2's multi-tasking, multi-threading capabilities, OS/2-based LANtastic servers will be able to support a large number of users and Artisoft has incorporated support for Named Pipes in conjunction with network applications allowing efficient inter-process communication on different computers, so users can take advantage of distributed client/server applications.

Network security is provided through access control lists (ACLs), under which administrators are able to specify privileges and rights.

LANtastic for OS/2 will be available in one, five, 10, 20, 50 and 100-user kits. The single user kit is \$187 and the five-user \$850. For details contact Artisoft Australia on (02) 880 2688. ▲



The AST Manhattan series: a spectrum of new services for all market sectors.

ASTFlashBIOS to allow upgrades over the network. Its list price is \$8,100.

AST has followed the lead taken by Compaq and now proffers a 19in rack-mounted system for enterprises looking to save space and ease physical server management. The system will allow up to four P, V or G rack-mounted servers to be placed in the one cabinet, and has built-in monitor, keyboard and UPS sharing. The system, known as the Manhattan high-rise, will be available in the first quarter of next

BEYOND TOMORROW...

MOEBIUS



Todaytech offers the most powerful Moebius Pentium range available

today. The new Pentium range has been optimised to deliver the best performance available in the industry. Pentium is the ultimate processor and it copes easily with today's most demanding software, such as financial modelling and other applications with the added benefit of future processor upgradeability.



CANON PRINTERS

"Say it with a Squirt"



BJC4000 — This printer doesn't readily lend itself to comparisons with other printers. For good reason. It is the only printer on the market to combine the benefits of a personal laser, with one of the most advanced four-colour process systems available. In a size that will fit any desktop and a price that will satisfy everyone.

SPECS:

Interface	Centronics Parallel
Print Speed	Draft: 496 cps (black) 248cps (colour)
	High Quality: 346 cps (black) 173cps (colour)
Print Width	Max 203mm (8 inches)
Input Buffer	64 Kb
Paper Weight	Auto feed: 64 to 90 gsm
	Manual: 64 to 105 gsm

BJ200 — This Personal Squirt features elegant paper handling with a built-in 100 sheet paper feeder. It prints in a black ink whose richness produces quality documents hard to distinguish from a quality laser. Its 360 x 360 dpi printing gives it a 44% better resolution than either the leading ordinary inkjet, or most laser printers.

SPECS:

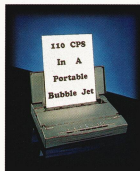
Interface	Parallel (Centronics)
Print Speed	Draft: 248 cps
	High Quality: 173 cps
	SHQ: 124 cps
Print Width	Max 203mm (8 inches)
Input Buffer	Up to 49 Kb
Paper Weight	Auto feed: 64 to 90 gsm
	Manual: 64 to 105 gsm



BJ10SX — For portable printing or at home use, the Little Squirts are streets ahead of any alternative. This model is practically silent, has 360 x 360 dpi resolution and is a lightweight at only 2.7 kgs

SPECS:

Print Speed	110 cps in all modes
Print Width	Max 203mm (8 inches)
Input Buffer	Up to 37 Kb
Paper Weight	64 to 105 gsm
Emulations	BJ130e, IBM Proprinter X24e, Epson LQ-510



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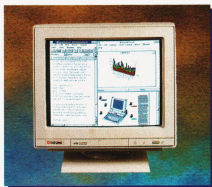
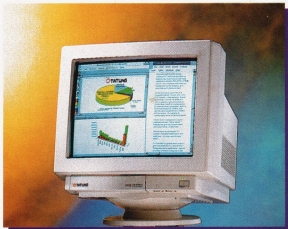
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SPECS:

CRT Size
Display Area
Max Resolution

Display Colours

Power Source

Power Consumption

Dimensions

Weight

CM15MKR

15", 90° deflection
260mm x 195mm
Horizontal 1024 pixels
Vertical 768 pixels

Infinite

AC 100-240V (auto sensing)

85 Watts Maximum

W371mm x H342mm x D380mm

12.4 kg

CM17MKR

CRT Size
Display Area
Max Resolution
Power Source

Power Consumption

Dimensions

Compatibility

Weight

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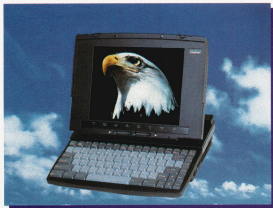
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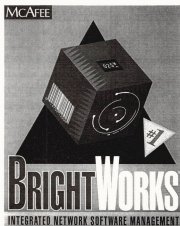
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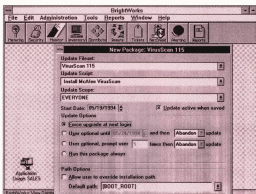
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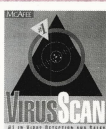


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The database answer?

ODBC spells universal access for some — and potential headaches for others.

BY BRIAN BUTLER

Recently small developers have turned to Microsoft to help them solve one of their most vexing problems: Creating applications that can access different proprietary databases. The problem of course is that the APIs available to developers are necessarily proprietary — except for one.

Microsoft's Open Database Connectivity (ODBC) API promises to save developers time and make life easier for users by enabling a single front-end application to access multiple back-end databases. With ODBC, standard Microsoft Windows applications — such as Lotus Approach and Microsoft Word — can use data stored in SQL-compliant databases.

On paper the idea looks great. It's much like writing to a printer driver, which developers have long done. An application developer would write the application to ODBC. Then ODBC utilises a 'database driver' (provided by a third party source, such as Intersolv or Microsoft) to map the application's database calls to a particular back-end. This way the application never need to know which particular database is being accessed.

Sounds simple, right? The problem is that databases are enormously more complicated than printers. ODBC simply can't contain all of their functionality. So the original ODBC specification offered the lowest common denominator: Only those commands that were common to a number of

database APIs were included in the specification. Customers who purchase a particular database for an advanced feature set will find that they are unable to take advantage of those features via ODBC.

Microsoft did provide a pass-through mechanism so developers could exploit particular aspects of the database that are not covered by the ODBC specification. A good example is stored procedures, which is an extension to the basic four ANSI SQL commands, under Sybase SQL Server. Naturally, exploiting such features deprives your applications of the reason that you moved to ODBC in the first place — database independence. Still, if you decide to port your application, you would have less code written in the native

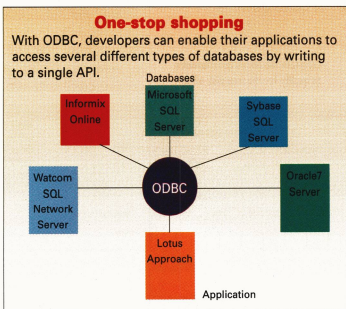
database format to port. Of course this assumes that the developer knows two APIs (the vendor's native API, in addition to ODBC), which again increases complexity.

Another criticism levelled at ODBC has been its slow performance. These comments were based largely on the first revision of the ODBC drivers, which have improved with time. Many vendors, like Watcom International, wrote their databases very close to the ANSI SQL specification, making them perfectly suited to ODBC. What's more, with many PC-based client/server applications focussed on decision support, they just don't require the high performance demanded by on-line transaction processing (OLTP). Because there are bad drivers out there, you do need to be careful about which driver you'll be using.

But the question remains: Who will benefit the most from ODBC? Probably small vendors and developers of niche products. A value-added reseller (VAR) developing a billing program for doctors'

offices might consider writing to ODBC. This would offer greater potential market than stretching limited resources to support all the available back-ends. The same argument holds true for small companies creating niche products, such as report writers. ODBC gives them a bigger market, and provides the market with new and innovative ideas.

ODBC also helps the small database companies like Watcom or XDB Systems. With ODBC, these vendors' tools gain access to front-ends that would normally only be available only to companies like Microsoft, Oracle or Sybase. The vendors with the least to gain are companies like Oracle, which already has a huge installed base. ▲





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PC Magazine, March 15, 1994

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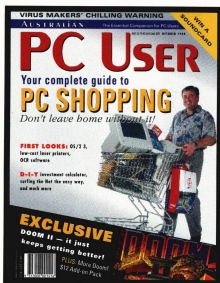
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Data encrypted today may not be secure
30 years from now.

BY JEFF PROSISE

How secure is encrypted data?

Just how secure is your encrypted data? Maybe not as secure as you think. Let's see just how difficult it is to crack a data file encrypted with WinCrypt. First, let's take a moment to review how WinCrypt works. When you input a password, WinCrypt replicates the characters of the password to fill a 512-character array. If the password is 'APC', the array initially looks like

APCAPCAPC...APCAPCAPC

The first element in the array holds the ASCII code for the letter P, and the 512th element holds the ASCII code for the letter C. We'll call this array A.

Next, WinCrypt passes array A to a cellular-automaton routine, which rearranges the array elements. The output from the routine is another 512-byte array (array B) containing a seemingly random pattern of bits in most cases. Array B is exclusive-ORed (XORed) into array A. Where array A or array B had a 1 bit, there will be a 1 bit; otherwise, the bit will be 0. This has the result of flipping some of the bits in array A.

Then WinCrypt seeds a random-number generator with a number derived from the password and fills yet another 512-byte array (array C) with random numbers. Finally, WinCrypt XORs array C into array A, producing a sequence of 512 numbers that serves as the encryption key. To

encrypt a file, WinCrypt reads the file in 512-byte blocks, XORs the bytes in the block with the bytes in the key, and then writes the XORed data back to the file.

The security of the algorithm is to some extent dependent on how successful the cellular automaton and random-number generator are at eliminating repeating patterns and leaving behind a more or less random sequence of numbers. To illustrate to you that this part of the algorithm works, Figure 1 shows a hex dump of the encryption key. While a file encrypted using only the characters in the password would be easy to break, the resulting key clearly presents more of a challenge. In essence, a

Discussions regarding WinCrypt have provided some very practical lessons in decryption methods and the foolishness of placing absolute trust in any encryption program

5-byte key has been expanded into a 512-byte key.

There are well-established methods for cracking XOR encryption algorithms that use known key lengths, so I had no delusions that WinCrypt would be unbreakable. The expanded key length makes it harder to break and means that a

person attempting to crack the code would need a proportionally larger volume of data to work with. A 500-byte ASCII text file encrypted with a 5-byte key would be trivial to crack. Cracking the same 500-byte file encrypted with a 512-byte key would be exceedingly difficult. A data file might be several kilobytes (or hundreds of kilobytes) in length, however, so a person with a rudimentary knowledge of crypt analysis could easily decode most text files encrypted with WinCrypt. This was exactly what some of our readers pointed out.

Another issue came to light, too. Many application programs begin their data files with headers that vary little from file to file.

If the contents of this header are known and the header is at least 512 bytes long, it would be simple to derive the 512-byte encryption key by XORing an unencrypted header with the first 512 bytes of an encrypted file. Once the key is known, the remainder

of the file is easily decrypted, since the same key is used throughout. Consider this excerpt from an e-mail message that came to me via the Internet:

You've said that it is virtually impossible to reconstruct the password because of the one-way nature of the cellular automaton and the random-number generator. I agree

```

CE 35 7F 66 68 FB AA D1-06 D8 EF FF EA D1 F1 6D
79 64 F4 1B D4 A6 P6 3D-49 AC 5E 8B F5 D4 4E
9F FD 73 6C 56 DA 65-66 C3 83 24 69 BA 86 26
AC 41 E2 B0 DF 3D FC 97-9E 7A 3C 35 8B F9 D9 5D
86 D3 89 A0 55 C6 1B A8-F3 73 56 B0 AC 9B 7C BA
07 9D 13 88 AA FB C2 DE-B6 5C 1E 01 ED C2 C3 E3
A0 FA 39 47 3C 47 05 C9-D5 AD E0 EC 64 D9 P7 2A
C3 C0 23 21 01 8F B6 3E-A6 EF BA E6 FA AB 54 C0
32 D5 06 73 24 95 D7 BC-52 7E C1 76 82 96 D8 C6
26 6E 59 85 8E 7D D0 21-36 80 79 B4 FB 3F B3 84
66 58 5C 54 3C 78-DC 61 8E D3 7C B6 BA AE
F2 92 6D CE 84 E9 F7 FF-C3 73 76 2B 1B D4 5C 75
73 55 77 24 D6 D4 6B F8-F6 29 D3 14 33 F8 3B 25
23 A5 BD A1 13 82 14 2D-7B 55 5C 4B 5E AB 9A 9P
52 B9 04 5A E2 A5 3D 5A-67 1A B8 6D 3A AA 94 12
99 2B 9F DE EA 87 DB DB-FE B1 0E AF E5 8E DB EF
85 FE 70 D3 C5 76 9E 43-08 98 7B 3F 1A 44 B0 A1
B5 B0 70 8C 56 AE 83 5E-1C BB 7C 35 B8 6B 4A 21
D8 FF 46 AC B6 BC 63 41-C2 55 D3 98 5F B1 A1 35
C1 E8 69 AC 8F 24 29 85-41 F4 52 FB 2E 44 AE 25
67 C6 CA A2 22 36 BC 74-C5 16 8C 1E AD 21 CC 33
22 36 67 39 29 4B 6A 86-FB 0F C7 67 2E C2 38 11
93 4B AB AB 0B 42 41 3C-6C 92 B1 47 59 B0 50 C3
F6 B2 61 25 D5 9A B2-88-2E 11 5F BF DC 54 6F 1D
AA 65 16 49 C9 28 6C B6-78 61 B6 D8 E2 72 F4 C2
88 E2 59 85 54 C2 52 F1-35 9D F1 E2 BD 52 CD 67
7E AD AB AD F8 43 4D 36-53 23 40 1F 9D 4A 2D 77
C7 52 88 07 8A 94 8B C4-6C 82 7E 78 7A 2D 6C 77
9B FE FC 08 59 13 31 3C-25 40 80 03 54 E2 23 B8
34 45 BB BC 21 3B A8 80-AB B0 14 D5 61 9A C6 BA
51 AB 2B C6 D7 FC DF 3F-84 8F 69 98 DF F5 2D 84
51 18 E2 52 EF 67 37 7C-A5 8C 08 66 87 BF DF 09

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Figure 1: WinCrypt generates a 512-byte encryption key containing a more or less random distribution of members from a password whose length may be much shorter.

with that. However, it would be relatively simple to reconstruct the 512-byte encryption key from an encrypted Microsoft Word for Windows file, because WinWord places a standard preamble at the beginning of every document. An XOR between the preamble and the first 512 bytes of the encrypted document would produce the encryption key, which could then be used to decrypt the rest of the file. I would expect that other application programs use similar preambles.

To test this theory, I compared the headers of two similarly sized Word for Windows 2.0 documents. In the first 512 bytes, there were 321 matches and 191 mismatches. This means that about 63 percent of either file could be recovered intact if a user had an encrypted version of one file and an unencrypted version of the other — despite the fact that the text of the documents is completely different. That's far from perfect, but it's more than enough to provide a peek at the contents of the encrypted file.

Another reader theorized that it wouldn't be difficult to break text files lacking file headers by trying various key combinations that produce common ASCII character codes:

WinCrypt carefully reinforces the front door by using a complex method of converting a password to a key. But it leaves the back door ajar by using a simple XOR method with a repeating key. If you know some of the plaintext (the unencrypted

data), you can XOR it with the ciphertext (the encrypted data) and recover the key. Word processor files often begin with sizable headers that are the same or nearly the same for every file.

For ASCII text files, it's a little harder. You can usually guess some of the plaintext — that is, line terminators, spaces, common words and phrases, and so on. The same technique would work, provided the file size is much greater than 512 bytes.

It wasn't long before another reader, Kent Briggs, posted a program on CompuServe that decrypts ASCII text files encrypted with WinCrypt and does so without the password. The decryption method relies on the fact that a typical text file contains many characters with the values 10 (line-feeds), 13 (carriage returns), 32 (spaces), and 97 to 122 (lowercase letters). It also knows that the first byte in the encryption key is used to encrypt not only the file's 1st byte but also the 513th byte, 1,025th byte, and so on. Using this knowledge, the program works its way through the file, XORing all bytes that correspond to the same position in the key (that is, with values from 0 to 255).

The value that yields the greatest hit count — the number of resulting bytes that equal 10, 13, 32, or are in the range 97 to 122 — is assumed to be the proper key value. The result? For large ASCII files (10K or larger), the program is incredibly accurate at deciphering text encrypted by WinCrypt. Even for text files only 4K or 5K

in length, it works amazingly well. To see for yourself, download WCRK10.ZIP from Library 6 (File Utilities) of CompuServe's IBMSYS forum. The program comes complete with Pascal source code.

The curse of the repeating key

Although WinCrypt will still protect sensitive data files from run-of-the-mill PC users, it clearly will not stand up to determined attacks. This is especially true if the file size is much larger than 512 bytes and certain characteristics of the original file are known to the attacker. Generally speaking, no XOR-based encryption algorithm is safe when the key size is significantly less than the file size.

WinCrypt is not alone in this regard. In his book *Applied Cryptography* (John Wiley & Sons, 1994), Bruce Schneier claims XOR encryption algorithms are prevalent in DOS and Macintosh software programs: The list of software vendors that tout this sort of algorithm as being — almost as secure as DES — is staggering. It might keep your kid sister from reading your files, but it won't stop a cryptographer for more than a few minutes. He goes on to say that the only safe way to implement an XOR encryption algorithm is to ensure that the key size matches the data size and that the key is truly random. When these criteria are satisfied, attacks must be leveled against the key generator itself and not the encrypted data.

The problem with WinCrypt is the repeating 512-byte key. If the key length equaled the file length — in other words, if a new 512-byte key were generated every 512 bytes — then WinCrypt would be substantially more difficult to crack. Decryption programs such as Mr Briggs' would not work, because there would be no relationship between disparate bytes in the file and thus no way to perform the necessary hit tests. File headers wouldn't be a problem, either, because successfully decrypting the first 512 bytes would not help to decrypt the rest of the file. People wishing to decrypt the file would have to attack the key-generation algorithm, and everyone seems to agree that this approach would be much more difficult.

The kicker is that a simple change to WinCrypt's source code would eliminate the repeating key.

WinCrypt could, for example, pause after every 512 bytes and generate a new key, using the current key as the input instead of the array filled with password characters. Think about it: The key would in all likelihood never repeat, and each new key would be dependent on the previous one. The result would be an endless stream of pseudorandom byte values with which to encrypt the file. To a cryptographer, that's a dream come true.



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So what prevents my making the change and posting a more secure version of WinCrypt on CompuServe? Simple: I don't want to go to jail. Nor do I care to become entangled in endless government red tape. For better or worse, the government restricts the export of encryption technology, including programs that perform data encryption. CompuServe is an international resource; posting a program on CompuServe could legally be construed as exportation.

If you write an encryption program that's too secure, you can't publish it — not internationally, anyway. If it's not secure, you can publish it, but nobody wants it because it doesn't protect data. Pick your poison.

Et tu RSA?

No one knows how secure a cryptosystem is until it is broken. We consider the DES (Data Encryption Standard) to be secure, because it has withstood attacks of various types for about 20 years now without divulging its secrets. Still, there's no guarantee that there's not a back door that has simply been overlooked. Soon after my columns on data encryption appeared, I learned that RSA, a widely used cryptosystem believed to be among the world's most secure, had been "broken." If you're inter-

ested, you can read all about in the July 1994 issue of *Scientific American* ("Superhack").

RSA is a public-key system. In a public-key system, a message is encrypted with a public key, which is freely given out, and decrypted with a private key, known only to the recipient. With RSA, a user derives a public key in part by picking two very large prime numbers and multiplying them together to produce an even larger number. The security of RSA is predicated on the fact that if the product is large enough, even the fastest supercomputer would take millions of years to factor it and guess the two primes. And you need the values of the primes to compute the private key.

In the August 1977 *Scientific American*, the inventors of RSA published a short message that had been RSA-encrypted with a 129-digit public key and challenged readers to decode it. According to the more recent *Scientific American* article, a team of computer hobbyists and Internet volunteers headed by Arjen K. Lenstra, a scientist at Bell Communications Research (Bellcore), recently decoded the message after eight months of effort. How did they do it? Essentially, they divided the factoring problem into hundreds of pieces and attacked it with more than 1,600 computers simultaneously. Then they fed the results into a massively parallel supercomputer at Bellcore, which cranked out the two prime

factors — one 64 digits in length, the other 65. Once the primes were known, it was a simple matter to generate the private key and decode the message.

RSA was not broken in the conventional sense. Arjen Lenstra and the others didn't find a secret back door; rather, they broke down the front door using brute force. The end result is the same, of course, and that's what matters. Does this mean that RSA is no longer viable? Far from it. It means that given enough time supercomputers can now break a 129-digit RSA code. RSA's inventors knew this would happen; they just didn't think it would happen so soon. RSA can theoretically use keys containing any number of digits, so RSA users can always stay one step ahead of the game by encoding their data with bigger public keys. What RSA users can't count on is data encrypted today still being secure 30 years from now. The same could be said of virtually any existing encryption algorithm.

And just what did the secret message in the 1977 *Scientific American* say? "THE MAGIC WORDS ARE SQUEAMISH OS-SIFRAGE." You figure it out.

Discussions regarding WinCrypt have provided some very practical lessons in decryption methods and the foolishness of placing absolute trust in any encryption program. ▲

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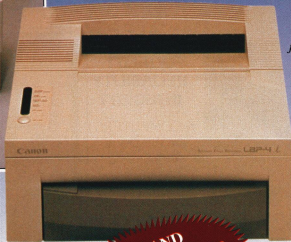
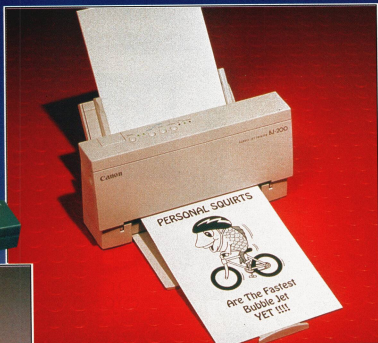
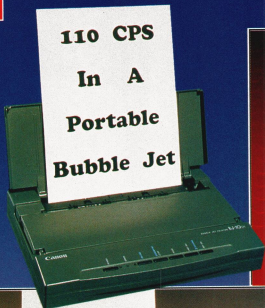
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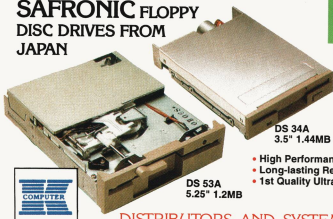
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An easy to use file compression utility that has all the features you'll need, from self-extracting EXEs to compressing directory structure.

BY RICHARD GOULSTONE

From LHA to EXE in two easy steps

Novice computer users often ask, "What is file (or disk) compression?", and answering that question seems a good way to start off this detailed look at LHA, one of the lesser known compression utilities available. File compression is when files on a disk are made physically 'smaller' using specially designed utilities (usually released as Shareware), such as LHA.

These utilities will also take multiple files (if you have selected more than one to compress) and include them in just a single file (sometimes called 'archiving'), though each file will have its own individual name inside the main file created. The amount that the files can be shrunk depends on which utility you are using, and what type of file they were in the first place. For example, ASCII files can be shrunk down to about 25% of their original size, whereas certain graphic files can't be shrunk at all. The average reduction for all file types would be between 30 to 50% of original size.

These compression utilities are good if you want to store unused data (takes up less room), transfer files across the phone lines (smaller and fewer files mean less time to transfer), or transfer files by disk, especially if you have one file that is larger than 1.4 megabytes. You will find that files on any BBSs (Bulletin Board Systems, accessed via a modem) are compressed using one or other of these

utilities. The one drawback to compressing files is that they cannot be run or accessed by other programs while they are in this compressed state. They must first be 'uncompressed' using the same utility that was used to compress them (unless they were made into a self-extracting EXE file first).

Disk compression is somewhat different. This is when the actual disk itself (usually a hard drive) is compressed by a program (Stacker and Microsoft DoubleSpace being the two most well known) to give you more room. All files can still be run when on a 'compressed' disk, but some incompatibility problems may occur when other vendors' software is installed. This article, however, will concentrate on file compression and, in particular, the utility LHA.

LHA was written in Turbo C++ (with some assembler routines) by Haruyasu Yoshizaki of Japan. To obtain the shareware version of LHA by mail, see the sidebar later in this article entitled 'How to obtain a copy of LHA'.

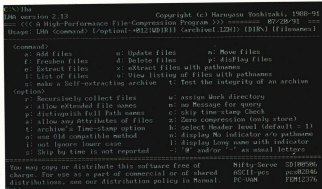


Fig 1: The help screen displayed when you type LHA by itself. All the commands, options and switches you can use are shown. A manual on disk is also supplied.

How it works

LHA is very easy to use. If you type LHA by itself at the DOS prompt the help screen will be displayed (see Figure 1) which lists all the commands, options and switches that can be used. Quite simply, to compress a file you type

LHA A ABC C:\DOS*.*

this will create a file called ABC.LZH (LZH is the extension that LHA gives to all files that it compresses), that will contain the entire compressed contents of the DOS directory in the one file. You can substitute the ABC to whatever you want to call the

Compression utility	Time to compress	Size of file compressed	Time to make self extracting	Size of self extracting	Time to uncompress
ARJ v2.00	67 seconds	893,718	n/a	n/a	25 seconds
LHA v2.13	69 seconds	905,294	13 seconds	906,975	21 seconds
PKZIP v2.04c	43 seconds	884,443	5 seconds	900,006	15 seconds

Fig. 2: Comparison table on compressing a directory of files of 1,811,886 bytes in size, with a mixture of text (ASCII) and binary files (all sizes in table are in bytes)

compressed file, and you can change the C:\DOS*. * to whatever path and files you wish to compress. If no path is selected, it will assume you are working with the files in the current directory. The A after LHA is the 'add' option.

To then uncompress this file type

LHA E ABC

It will uncompress the files to the current directory. When it encounters a file that is already present (i.e. a file being uncompresses has the same name as a file that is in the destination directory), then it will ask you if you want to overwrite it. If you wanted to keep the directory structure, then you would use the /X1 option

LHA A /X1 ABC C:\DOS*. *

This time if you uncompress the file ABC it would create a directory on the current drive called DOS and uncompress the contents of ABC into it. Now to make LHA really useful you can add the option S after LHA which will make the resulting compressed file self-extracting and executable (i.e. you

ASCII files can be shrunk down to about 25 % of their original size

won't need LHA again to uncompress the file). To use this feature, type the following AFTER you have first made the .LZH file.

LHA S /X1 ABC

There is no need to type the .LZH extension to ABC, but you must use the /X1 switch if you want the self-extracting file to create the directory structure. When

making a file self-extracting, make sure that the name you give to the compressed self-extracting file (the .EXE) is different from any .EXE files that are in the archive,

```

; Display File name-----
mov     word ptr [bx], 0 * 256 + ' '
mov     bx, dx
call    disp             ; output file name
mov     byte ptr [bx - 1], 0
jcxz    mn9;             !.BAT ?

; Check Existence of File-----
mov     ax, 4300h        ; get file attr
int     21h              ; (for MS-DOS 3.3)
jc      mn1

; Overwrite ?-----
mov     bx, offset overwt ; prompt
call    mesout
call    getyn
je      mn1

; Skip to next File-----
mov     dx, DGROUP:cpyhdr.PacSiz ; skip file
mov     cx, DGROUP:cpyhdr.PacSiz + 2
mov     bx, infile
mov     ax, 4201h
int     21h              ; Move a File

Pointer
jmp     mn6

mn9:    mov     cs:autoflg, 0dh

; Create a New File-----
mn1:    mov     cx, 0020h
mov     ah, 3ch
int     21h;             Create a File
$ if , C
jmperrwrite
$endif

; Decode-----
mn7:    mov     outfile, ax
xor     ax, ax
mov     curcrr, ax
dec     ax
mov     inpptr, ax
push    dx
$ if <or bp, bp>, NZ
call    decode
$ else
call    copyall
$endif
pop     si

```

Fig 3: Part of the listing for the code that is attached to the self-extracting files

otherwise that file will try to overwrite the one you are uncompressing from!

There are many more useful options and switches that can be used (again, see Figure 1), such as adding files to existing compressed files, but the commands outlined above are the options most often and commonly used.

Comparison

As I said, there are numerous Shareware file compression programs available at the moment, some well known and well used (PKZIP being the most famous), and some that were, but have now been superseded (such as ARC, the original file compression utility on the PC, and ZOO). Figure 2 shows a comparison table between LHA and two other popular compression utilities.

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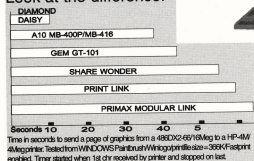
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This was by no means an exhaustive test, but it does give a general idea of speed and compression rates between the three. The version of ARJ I had access to didn't have a facility to make self-extracting archives, so this couldn't be tested. I'm not sure if ARJ lacks this feature or just the version that I used. As for the other two, PKZIP adds an extra 15,563 bytes when making a self-extracting file, regardless of size, where LHA only adds around 1,700 bytes. This means that on files that are compressed to 600K or less, LHA self-extracting files will actually be smaller than those for PKZIP.

The differences in the speed of operation and size of the files between the three utilities has to do with what kind of compression techniques and 'algorithms' (mathematical equations) the programmer used. Although in most facets PKZIP comes out on top for compressing files over 1.2 megabytes in size, LHA is, in my opinion, easier to use.

When making a file self-extracting, make sure that the name you give to the compressed self-extracting file (the .EXE) is different from any .EXE files that are in the archive

LHA inner workings

When LHA makes a self-extracting file it attaches about 1,700 bytes of code to the beginning of the archive. This code is then executed when you type the name of the .EXE that you created. The routine was written in assembler and part of it can be seen

in Figure 3. Another important part of LHA is receiving and processing the options that the user enters (see Figure 4). Remember that if the user enters nothing at all after LHA, then the help screen is displayed.

In conclusion

LHA is the compression utility that is used by Mag Disk to make the software it distributes into self-extracting .EXEs. This is vital to allow for easy installation of software by the user (it is done with the /X1 option so that the directory structure is created), and so more than 1.4 megabytes of software can be put on a disk. LHA is perfect for this type of application because of its ease of use and smaller finished compressed size when used on smaller files. If you are wanting to back-up seldom used data, or transfer files between PCs then I would suggest taking a look at the features of LHA.

```

/*****
getopt.c - get options
*****/
#include <ctype.h>
#include <stddef.h>
#include <string.h>
#include "lh.h"

char  flg_r, flg_p, flg_x, flg_m, flg_a, flg_c,
      flg_n, flg_t, flg_u,
      flg_v, flg_w, flg_i, flg_h = 1, flg_o, flg_z,
      flg_l, flg_at;

/*****
get options
*****/
int getopt(char *p)
{
    static char flg[] = "rpxmacntuvwihozl-";
    static char *flgpos[] = {&flg_r, &flg_p, &flg_x,
                             &flg_m, &flg_a,
                             &flg_c, &flg_n, &flg_t, &flg_u,
                             &flg_v,
                             &flg_w, &flg_i, &flg_h, &flg_o,
                             &flg_z,
                             &flg_l, &flg_at};
    static char val[] = "0-1+2";

    int i;
    char s;
    char *q;

    while ((s = tolower(*p)) != 0) {
        p++;
        q = strchr(flg, s);    /* search switch */
        if (q) {
            i = q - flg;
            if (*p && (q = strchr(val, *p)) != NULL) {
                *flgpos[i] = (q - val) / 2;
                p++;
            }
        }
    }
}

if 0
{
    else if (s == 'v' && *p) {
        if (flg_v == 0) /
    * process of '/vSTRING' */
        flg_v = 1;
        pager = p;
        p = "";
    }
}

endif

else if (s == 'x' && *p) {
    flg_x = 2;    /* process of
'/xSTRING' */
    regext(p);
    p = "";
}
else if (s == 'w' && *p) {
    flg_w = 1;    /* process of
'/wSTRING' */
    strcpy(workdir, p);
    p = "";
}
else {
    /* flip-flop */
    *flgpos[i] = !*flgpos[i];
}
}

if 0
{
    else if (s == 'k') {
        keyword = p;
        p = "";
    }
}

endif

else {
    if (s == '?' ) usage();
    return 1;
}
}

return 0;

```

Fig 4: Complete listing of the Get Options routine, to find out which options the user typed after they entered LHA.

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Quick reference guide**LHA**

Purpose: To allow you to compress (shrink) and archive files for storage and backup purposes or for transferring files between computers either by floppy disk or over a modem.

Setup: Once LHA is on your hard drive, it is probably best to put the directory that it is in your path statement (found in AUTOEXEC.BAT). This way you will be able to compress files from anywhere on your hard drive.

Remarks: Easy to use with many features and options. Has good compression ratio and fairly fast at 'uncompressing'. Perhaps not as fast at compressing files as other similar utilities, but has other features that make up for this shortfall.

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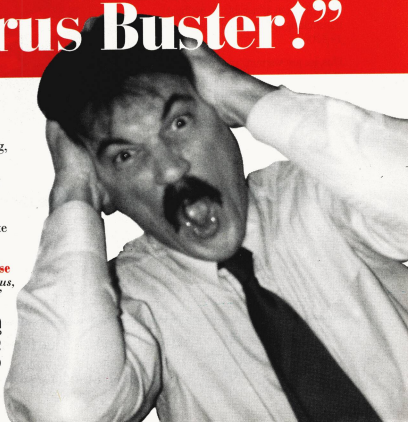
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TIP: Ink cartridges for HP Deskjet printers are relatively expensive, but have the advantage that they also contain the print head, which is therefore replaced before it wears out. As a result, costs can be more than halved by refilling cartridges with inks from a number of suppliers. I have experimented with a number of discarded cartridges using various inks and thickening agents and have found that Parker Quink is a cheap and effective substitute. The ink can be introduced through the breather hole at the top of the cartridge, with a syringe or similar device, starting at the bottom of the cartridge and gradually working up as the needle is withdrawn. This is necessary as the cartridge holds the ink in the pores of a heavy sponge. Clogged nozzles, visible as clear lines in the printout, can be cleaned by soaking the print head in a shallow container of water, or detergent solution.

Excellent quality results can be obtained, although up to 30 seconds should be allowed to ensure that the print is dry. One advantage of the thinner ink is that in solid filled areas coverage is much more uniform with no banding. The internal sponge makes it difficult to flush out all traces of the old ink and thus makes conversion to colour difficult. Repeated washing with small quantities of water will eventually work, but I prefer to gradually loosen the top cover of the cartridge, remove the sponge and wash it and the cartridge thoroughly.

Various colours of Quink can then be used for occasional emphasis in docu-

ments and drawings. No doubt Hewlett-Packard will not look favourably on this process, but faulty cartridges can always be discarded, and the savings on 20 refills would easily pay for a new Deskjet 500. I would advise caution in attempting this with any cartridge which does not contain the print head as failures may lead to expensive repairs.

Graham Jackman
North Clayton, VIC.



In an age when we should be recycling as much as possible, this is a great tip for HP Deskjet owners. As Graham says, be careful if you are trying to refill non-Deskjet cartridges, otherwise you may end up with a dead printer! There are companies around that specialise in refilling inkjet and laser printer cartridges, at cheaper prices than buying replacements. In most cases the print quality is the same as a new one, so why not give it a go the next time your inkjet or laser printer's ink cartridge needs replacing?

Richard Goulstone

Humming

TIP: I am writing with a tip to solve a problem that I recently had, which in this world of ever increasing multimedia use, may be of interest to your readers. I was having problems with a loud humming sound emanating from the speakers (Sound Blaster CT-38) on my Sound Blaster-16 card, but only when I used an external power supply.

It turned out that the solution was to

change power supplies and use a regulated power supply. Tandy was kind enough to swap the old one I had for the new regulated one, which works perfectly. Also, don't change any dip switches on the Sound Blaster-16 card when you supply external power to the speakers, it sounds much better with the dip switches set as they are shipped.

Tony Davison
Charswood, ACT



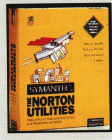
Using speakers with amplifiers, or the Sound Blaster speakers with boosted power (batteries or AC adaptor), gives you much greater volume, hence better sound quality. Powering speakers only through the sound card (regardless of make or model) will at the most only give you 5 volts to power the speakers' amplifiers, with the result of less than voluminous sound in some cases.

Richard Goulstone

Tip of the month

Congratulations to Ivan Mead of Roseville, NSW, for his excellent tip on how to use Quattro

Pro to solve the Rubik's cube puzzle. We'll be contacting Mr Mead to arrange a copy of Symantec Norton Utilities to be sent out, plus a cheque for \$100.



OPERATING ENVIRONMENTS

Stubborn directories

I am having some trouble with my computer which I think you might be able to rectify. I have just taken off the common spreadsheet Lotus 1-2-3 in the directory C:\LOTUS.

I used the DEL command to delete the contents, then I found that I couldn't use the RD command to remove the directory. I had successfully performed this operation on other directories, but it didn't work with this one.

Jason Lyons
Caboolture, Qld.



Directories cannot be deleted using the RD command if they are not completely empty. The directory in question may still have a read only file (which won't be deleted by the DEL command) or sub-directory in it. If you have DOS 6.xx then use one of its new commands:

DELTREE drive:\path to delete

This will delete the directory entered, and all files and sub-directories contained in it, so it should be used with care! If you haven't got DOS 6.xx, then you will have to enter the directory (CD LOTUS) and make sure it is empty, deleting any sub-directories that are there and changing the attributes (ATTRIB command) of any read-only files so they can be deleted.

Richard Goulstone

DATABASE

University thesis

I am now completing my Bachelor of Business degree at the University of Technology, Sydney. I am doing my first large database, that is to do a job not unlike the ATP tennis rankings. It will hold a lot of records (say up to 10,000 players and 100,000 results) and do a few calculations to arrive at the ranking. I am not sure if I should be using a language (such as C or Pascal) or a database. And if a database is most suitable, I would prefer to use one that is easy to use, powerful and an industry standard. Would Microsoft Access be appropriate?

Adam Cogan,
Sydney, NSW.



I will presume that you are using an IBM compatible format, and having said that, I would suggest that you use a database and not a language. This is mainly for the ease of use both for you when you are developing the database and for any end users (the menuing and file handling systems on a database will be simpler for you to write and easier for the end user to operate). The question on which database to use is more tricky. Two years ago the industry standard was dBase IV, but now there are many packages to choose from, and no real 'standard'. For DOS I would recommend the newly released dBase V for DOS (or the

older dBase IV, which you should now be able to get cheaply). In the Windows line it is mainly a matter of what features you want, and the price you are prepared to pay.

There are many good packages available, Microsoft Access, Paradox and dBase V, to name just a few.

The speed of processing will largely depend on what type of machine you will be running the database on, but for a large database such as the one you are contemplating, anything less than a 486DX50 could have you waiting long periods for any reports or calculations to take place.

Richard Goulstone

SPREADSHEETS

Rubik's cube

TIP OF THE MONTH: I was very interested to read, in the August issue of APC, the account of K. Ikaunieks' excellent implementation of the Game of Life on a spreadsheet. It has always been my stated conviction that a spreadsheet can be used to do anything except put together the design of an A-bomb (and maybe even for that, if you've got the maths). Some years ago a person whom I had, until then, thought was well-disposed towards me, handed me a Rubik's cube (which was in a mess, and had been so for a long time) and suggested I use a spreadsheet to get it back to its original condition.

Getting a working model to run the elementary moves was not too arduous. Creating macros to drive the cube in complex moves was much more difficult, mainly because I am a hopeless Rubik's cube dummy. However, the limitations of spreadsheets at that time dictated that the

display of the cube must be essentially monochrome, mostly symbolic, and consequently not at all easy to follow. Also, it was not easy to manipulate the cube, since one had to remember the names of the various driver macros. But I was finally able to return the cube to its owner in pristine condition, without having to dismantle it, or remove and re-stick the colour patches. I moved on to other things, and eventually upgraded to Quattro Pro for Windows, but I used it only to run my existing applications.

One day I was idly scanning through the file-list when I came across the old Rubik file, and I wondered if I could make it more user-friendly. Since I had not previously used any of the graphics functions of Quattro Pro, I had to read the manual for a little while, but I found that I could cobble together a reasonable display (see Figure 1), including a driver for the colours in a surprisingly short time from the opening of the book.

Adding the buttons to drive the cube macros was a trivial, mostly intuitive exercise. No new macros were added to the original set, but I can't remember why I built some of them in the first place (maybe they were accidental). In the final model only those macros which seemed reasonably useful were assigned a button. The graphical version of the original model is found in RUB-DEV.WB1, which needs an 800-by-600 screen setup for proper viewing. You can see that even with coloured segments it is not easy to visualise the effect of future moves. The original colour driver re-coloured all 54 segments of the cube after every move. It seemed to me that this was the slowest part of any operation, so I added a section to each of the core macros so that only those segments which had been moved were re-coloured.

I figured I could also improve the depiction of the cube, so I contrived a 3D render-

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The Internet — from nerd herd to household word

BY MICHAEL AITKEN

It's been a big year for the Internet. As 1994 draws to a close, we take stock of recent developments.

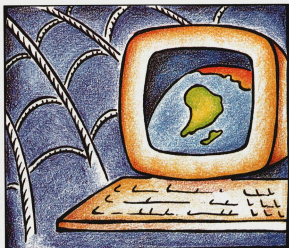
This column has covered the Internet since March this year. Since then we've looked at netiquette and covered key tools like FTP, gopher, Telnet, and the World Wide Web. We've surfed through online gaming and other points of interest, graduating from terminal emulation to SLIP/PPP access from Windows.

Much has happened on the Net in that time, both in Australia and overseas. 1994 saw the Internet burst into the cultural mainstream. The explosion, from academic and research institutions out into the general, educational and commercial communities accelerated during the year, and shows no signs of slowing. The Internet is becoming a household word. Net addresses are appearing on more business cards. More schools and homes are getting wired.

A crude but effective indicator of growth is the 'Internet Walk', a survey done by US company Network Wizards. A recent survey showed that the number of Internet hosts topped 3 million in July 1994, an increase of 81% for the 12 months. Australia accounted for around 130,000 of those hosts, an increase of 42% over six months.

There are many reasons why people outside the traditional academic and research preserves have poured in as the Net's gate-keepers eased access limits. The Internet has the attraction of a bustling city — it is many things to different people. At the basic level, email is a cheap and effective form of communication — inter-office, interstate or international. At the high end, realtime duplex multimedia transmission is possible, given adequate bandwidth. And there's plenty in between.

There has been spectacular growth in



commercial presence on the Net this year. A recent US study estimated that, by 1998, US firms will have spent \$1 billion on services and equipment to support commercial Internet applications.

An industry has grown up around access tools and Internet education. This is both a response to demand and a driver for future demand. IBM has estimated that, during 1994, one million people joined the Net every month, and about 40% gave up finding it too hard. It's still not easy: setting up a public domain SLIP connection for Windows has often meant serious work under the PC's hood. The naked Unix shell account is not exactly seductive.

But tools are changing rapidly. The centreless nature of the Net means that innovations can come from many sources, and propagate fast. There is an increasing number of public domain, shareware, and shrink-wrapped packages that make access richer and easier. For users stuck with dial-up shell accounts, software is available that will emulate SLIP through shell accounts (The Internet Adaptor, Slipknot).

New and impending operating system releases (Microsoft's NT and IBM's Warp

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BBS police

BY STEPHEN WITHERS

Earlier this year, the Federal Attorney-General and the Minister for Communications and the Arts set up a task force to "consider options for developing a system of regulation of BBS..." This basically came about because someone realised that if the government was going to censor (or, if you prefer, classify) computer and video games, it had better take a look at material that was being distributed via the phone lines.

The stated concern was "the prospect of children gaining access to violent or sexually explicit material through home computers," even though "somewhat less than 3%" of homes contain a PC, modem and an unsupervised child. That 3% is the figure for homes with a PC, modem and child, so my bet is that the "unsupervised" percentage is much lower. Still, as the report points out, this number is only going to grow.

One of the most interesting sentences in the report is this: "It [the task force] received no submissions from persons complaining that they or their children had gained access to offensive material posted on BBS."

There are several ways you can look at this. You could argue that this admission shows there really isn't a problem, and that the whole issue is a beat-up. Or it could be that the people, who had something to complain about, didn't know of the task force's existence. An equally valid perspective would be to praise the government for being farsighted and trying to prevent the law falling too far behind the advance of technology. While you wouldn't expect the report to give any clues about who said what in their submissions, I was worried that no indication was made of the number of people taking a particular stance. While this kind of inquiry isn't meant to be a democratic process in the sense of determining a majority view, expressions such as "submissions were also received calling for BBS to be strictly regulated..." leave me wondering if any more than two such submissions were received.

Another worry is the definition of a BBS: "a system of electronically stored information accessed by computer through the use of a telecommunications network which allows a bidirectional transfer of files or messages between the user and the system." Why does that worry me? Well, this is a deliberately broad definition, and as a result it covers an awfully large number of private systems. If your company uses electronic mail to connect two or more offices, that system would be classed as a BBS. Does your LAN provide remote

access for people working at home or on the road? Has your LAN grown into a WAN? If you are a Macintosh user, have you installed Apple Remote Access so you can dial into your desktop machine from a PowerBook or a borrowed Mac when you are travelling? Does your communications package support dial-in facilities? (many do.) By my reading, all of these scenarios fit the proposed definition of a BBS. As a result there is a very real risk of a major loss of privacy if this definition is accepted.

One of the things that did impress me about the report was its attempt to be technology-neutral in the sense that it seeks the consistent treatment of material regardless of whether it is communicated electronically or by traditional ways. This includes the use of BBSs to assist in fraudulent activities as well as the distribution of pornographic material. One exception to this position is an acceptance of the belief embodied in the games classification that interactive games have a greater effect on the user than non-interactive material.

The task force put forward three options which are increasingly interventionist and less cost-effective. Actually, four were put forward, but the maintenance of the status quo was rapidly discounted.

The first and favoured possibility is the development and adoption of a set of guidelines ostensibly based on "current best practice," but with the possibility of sanctions for errant sysops and users as severe as permanent disconnection of telephone services.

Secondly, there is a "partial classification scheme" (the alternative recommendation) which would prohibit material that would be refused classification if it was a film, publication or computer game. This could be extended to require operators to restrict access according to the age of the user and the classification of the material.

Finally, there is a "full classification" scheme, which would be very expensive (and arduous for sysops) as it would mean everything on a BBS would have to be classified.

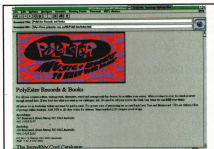
If you are a sysop or a keen BBS user, you should read the report for yourself. There's a lot in it that needs considering, and you shouldn't rely on other people's summaries (even mine!). Contact the Attorney-General's Department on (06) 250 6666, fax (06) 250 5918, and ask for a copy of the report of the task force on the regulation of computer bulletin board systems.

edition of OS/2) loudly promise built-in support for dial-up GUI access. Internet awareness is also promised in Microsoft's planned Marvel online service.

With tools offering more access for less effort, a growing PC population, and dropping modem prices, we can expect more Internet starters, and a fall in the drop-out rate.

While the Infobahn has been the great talk issue of 1994, the Internet has been the achiever. Aside from line-speed limits (for most of us, anyway) the Net is the highway at our doors.

Like a rising tide, the Internet has surrounded many online services. We have seen both Oz-Email and CompuServe open their doors to it. The readily affordable In-



Visit Melbourne's Polyester records through Glass Wings Arcade.

ternet has put significant competitive pressure on other services, forcing price reductions and higher quality offerings.

Rampant growth has brought a series of challenges. As the Internet has become more real for more people, it has had to deal with real world problems. To name a few, we've seen a Net-based defamation case in Australia, promotional 'spamming' (saturation Usenet posting) by an Arizona law firm, censorship issues, the Clipper debate, virtual harassment, and struggles with governance issues in MUDs.

Burgeoning Internet activity has stressed the infrastructure, which in turn brought proposals for charging users for Internet traffic. While details are vague at the time of writing, we can only hope that charging schemes don't make this country less clever or creative.

Michael.Aitken@werple.apana.org.au

NEW Systems

NSW

ALPHA II BBS (02) 567 7096. MV. Andrew. V.22, V.22bis, V.23, V.32, V.32bis. 6pm-7am weekdays, 24 hours weekends.

Flashpoint BBS (02) 958 3766 Multi-Line [10]. P. Max Wild. V.22bis, V.32, V.32bis, V.32bis. 24 hours.

Millenium (02) 869 0235. P. Alex Assouline. V.21, V.22, V.22bis, V.23, 24 hours.

Spotty's Den BBS (02) 546 5106. MV. Brad Dixon. V.21, V.22, V.22bis, V.32, V.32bis. FidoNet 3:712/815. 24 hours.

The Assembly (02) 824 1012. P. Lord Chaos. V.21, V.22, V.22bis, V.32, V.32bis. 24 hours.

The Battle Bridge (02) 971 4304. MV. John Inkson. V.22, V.22bis, V.23, V.32, V.32bis. FidoNet 3:714/932. 24 hours.

The Vortex (02) 629 4373. M. rEAPER. V.21, V.22, V.22bis, V.23, V.32, V.32bis. 24 hours.

Coalfields BBS (049) 98 1462. MV. Craig Robinson. V.21, V.22, V.22bis, V.23, V.32, V.32bis. 24 hours.

DarkZone (063) 72 1260. P. immortal iLLUSION. V.21, V.22, V.22bis, V.23, V.32, V.32bis. FidoNet 3:623/683. 24 hours.

PC2000 BBS (066) 51 6625. MV. Timothy Mole. V.22, V.22bis, V.32, V.32bis. 24 hours.

Sanctuary BBS (049) 43 9243. P. Arie G. Upton. V.22bis, V.32, V.32bis. FidoNet 3:622/421.5. 6pm-5am daily.

Vic

Apex Australia BBS (03) 379 0392. P. Brett Parker and Lindsay Moriarty. V.21, V.22, V.22bis, V.32, V.32bis. 24 hours.

Chantel Amiga BBS (03) 562 6727. MV. Andrew Breedon. V.21, V.22, V.22bis, V.23, V.32, V.32bis, V.32bis. V.32bis. FidoNet 3:636/106. 24 hours.

Count Down Extinction (03) 886 1526. P. Peter Zelezny. V.21, V.22, V.22bis, V.23, V.32, V.32bis. 24 hours.

Flying Blind (03) 312 6676. MV. Les Ross. V.21, V.22, V.22bis, V.32, V.32bis. FidoNet 3:633/158.5. 24 hours.

Sight and Sound (03) 397 8515. P. Caffeine. V.21, V.22, V.22bis, V.23, V.32, V.32bis. FidoNet 3:635/532. 24 hours.

The Next Level (03) 705 1058. P. Matthew Piening. V.22bis, V.32, V.32bis. FidoNet 3:639/200.3. 24 hours.

The Unicorn BBS (03) 827 1663. P. Mitchell Russian. V.22bis. 24 hours.

Data Buzz BBS (058) 71 1874. P. David Chandler and Mervyn Jack. V.21, V.22. 24 hours.

Narcosis Public Access Unix (052) 24 1407. M. Dave Keller. V.21, V.22, V.22bis, V.23, V.32, V.32bis. Internet narcosis.apana.org.au. 24 hours.

Format of listings

Entries in our listings contain the following information: system name, phone number, access, operator's name or alias, supported modem standards, network node number and hours of operation.

The access code may be P [Public], M [Members/registered users only], MV [as M, but with limited Visitor access].

The modem standards are V.21 (300bps), V.22 (1200bps), V.22bis (2400bps), V.23 (1200/75bps), V.32 (9600bps) and V.32bis (14400bps). WorldBlazer/TrailBlazer, HST, V.32terbo and V.32bis Class are default high-speed standards.

The four main BBS networks in Australia are FidoNet, INtNet, GtNet and WorldNet.

These networks provide a way of sending public or private messages between boards, whether they are in the same suburb or half a world apart.

ACT

Breaking Away (06) 231 1318. P. David Fabris. V.32, V.32bis. 24 hours.

Capital BBS (06) 292 8086 Multi-Line [3]. MV. Matt Austen. V.22bis, V.32, V.32bis, V.32bis. V.32bis. FidoNet 3:620/263. 24 hours.

Chaos to Order (06) 282 3209. MV. Paul Bowtle. V.22, V.22bis, V.32, V.32bis. 9pm-7am daily.

GridPoint (06) 258 3023. MV. Armigate. V.22, V.22bis, V.32, V.32bis. 24 hours.

Qld

Wombat's Lair BBS (079) 85 9120. P. James Porter. V.21, V.22, V.22bis, V.23, V.32, V.32bis. 24 hours.

SA

Centre Point (08) 265 0485. P. Neil Ridley. V.21, V.22, V.22bis, V.23, V.32, V.32bis. 24 hours.

Dead Good (08) 326 3836. P. John Spence. V.21, V.22, V.22bis, V.23, V.32, V.32bis. FidoNet 3:800/416. 24 hours.

Deep Space Nine (08) 331 9809. P. Nic Cottrell. V.22, V.22bis, V.32, V.32bis. FidoNet 3:800/836.6. 24 hours.

La La Online (08) 344 9711. P. Lisa McKinnon. V.21, V.22, V.22bis, V.23, V.32, V.32bis. FidoNet 3:800/413. 24 hours.

Sight & Sound BBS (08) 287 0099. P. David Overbeek. V.21, V.22, V.22bis, V.23, V.32, V.32bis. FidoNet 3:800/896. 24 hours.

Bob's Place (085) 36 4121. P. Robert New-

ton. V.21, V.22, V.22bis, V.23, V.32, V.32bis. 10:30pm-5:30pm daily.

WA

Silicon Fish (09) 279 6746. MV. Ian Taylor. V.21, V.22, V.22bis, V.23, V.32, V.32bis. FidoNet 3:690/364. 24 hours.

Updates

NSW

500cc Formula One TBBS (02) 565 1630 Multi-Line [20]. M. Dino. V.22, V.22bis, V.32, V.32bis, TrailBlazer, V.32bis. FidoNet 3:712/218. 24 hours.

A Vampire's Crypt (02) 837 2645. MV. Darren French. V.22bis, V.32, V.32bis. FidoNet 3:713/816. 24 hours.

AfterShock See dejavu.geko.com.au.

Amiga File Server Permanently offline.

dejavu.geko.com.au (02) 740 4410 Multi-Line. M. Angry. V.22bis, V.32, V.32bis. Internet dejavu.geko.com.au. 24 hours.

Electronic Pandora Permanently offline.

Hot-Line (02) 369 3244 Multi-Line [6]. MV. Nick Harvey. V.21, V.22, V.22bis, V.23, V.32, V.32bis, V.32bis. FidoNet 3:711/941. 24 hours.

Klub Kaos BBS Permanently offline.

NetRunners (02) 824 1097. MV. Paul Zagoridis and Paul Camillos. V.21, V.22, V.22bis, V.32. FidoNet 3:712/537. 24 hours.

Silent Running Permanently offline.

Strictly Business Permanently offline.

Tesseract CAS (02) 477 7271 Multi-Line. MV. Warren Gerdes. V.21, V.22, V.22bis, V.32, V.32bis, V.32bis. FidoNet 3:711/451. 24 hours.

Amiga Exchange Australia Permanently offline.

Local BBS (049) 62 1768 Multi-Line [3]. MV. Tony Dodds. V.21, V.22, V.22bis, V.23, V.32, V.32bis, V.32bis. FidoNet 3:622/409. 24 hours.

Team Terminal Permanently offline.

The Hard Disk Cafe Permanently offline.

Vic

Breakdown BBS (03) 532 0010 Multi-Line [7]. P. Electron. V.22, V.22bis, V.32, V.32bis, V.32bis. FidoNet 3:632/503. 24 hours.

Compupal Amiga BBS (03) 789 1906. V. Ron Heffernan. V.32, V.32bis. 8pm-8am daily.

Northern Computer Service BBS! (03) 304 1972. P. Mark Beel. V.21, V.22, V.22bis, V.23, V.32, V.32bis. FidoNet 3:633/262.2. 24 hours.

Satellite BBS (03) 842 2678. V. Alistair Simpson. V.21, V.22, V.22bis, V.32. FidoNet 3:633/269. 24 hours.

The Software Works (03) 589 1638 Multi-Line [4]. MV. Simon Gronow. V.22, V.22bis, V.23, V.32, V.32bis, V.Fast Class. FidoNet 3:632/998. 24 hours.

Qld

Der Zauberberg Permanently offline.
ESE ESCAPE BBS See eseLINK Communications Network.

eseLINK Communications Network (07) 870 5500 Multi-Line [8]. MV. Mark Garlipp. V.21, V.22, V.22bis, V.23, V.32, V.32bis, V.Fast Class. FidoNet 3:640/371. 24 hours.
Seldom Inn Permanently offline.

The Data Bite BBS (07) 899 1922. MV. Nathan Keynes. V.21, V.22, V.22bis. FidoNet 3:640/591. 24 hours.

Zeros and whunZ

Dragon's Den Permanently offline.
The Galaxy GateWay Computer System (074) 26 8557 Multi-Line. M. James Collins. V.22, V.22bis, V.32, V.32bis. FidoNet 3:640/316. 24 hours.

SA

Phone Box BBS Permanently offline.
Spelljammer BBS Permanently offline.

WA

ACE BBS (09) 454 4715. P. Tom Temple.

Submissions

The information in this column is provided by the Australian BBS Registry. It is presented in good faith but APC cannot take responsibility for its accuracy. New information and updates should be sent to the Registry Co-ordinator in your state.

You can also post BBS List news onto the EchoMail conference, BBS_NEWS, which is available nationally as a public area. Netmail BBS List enquiries to Rodney Creer at 3:713/317. Postal registrations to PO Box 731, Penrith NSW 2751.

National Rodney Creer, Australian BBS Registry, (047) 35 6789, FidoNet: 3:713/317, PO Box 731, Penrith NSW

V.21, V.22, V.22bis, V.23, V.32, V.32bis. 24 hours.

STAR-BYTE BBS (09) 458 1255 Multi-Line. MV. Harry Oldenhuis. V.21, V.22, V.22bis, V.23, V.32, V.32bis, V.Fast Class. FidoNet 3:690/416. 24 hours.

The Matrix BBS (09) 279 1745 Multi-Line [3]. MV. Micheal and John Keohane. V.22, V.22bis, V.32, V.32bis, V.32terbo. FidoNet

2751

NSW Greg Kuhnert, #1 BBS, (02) 544 7123, FidoNet: 3:712/513

Vic Marcus Limosani, The Infinity Links BBS, (03) 850 9115, FidoNet: 3:633/262
ACT Craig Gibson, Caught in the ACT BBS, (06) 292 8288, FidoNet: 3:620/252
Qld James Collins, The Galaxy GateWay Computer System, (074) 26 8557, FidoNet: 3:640/230

SA Grayham Smith, Oracle PC-Network, (08) 234 0791, FidoNet: 3:800/804
WA Graeme Platt, 1990 Multiline, (09) 370 3333, FidoNet: 3:690/254
Tas Roy Austen, Tassie DataBank, (003) 44 9762, FidoNet: 3:670/301
NT Graham Smith, CyberNet IV, (089) 45-3638, FidoNet: 3:850/103

3:690/402. 24 hours.

ZULU See ACE BBS.

Tas

The Solar Connection (003) 44 8452 Multi-Line. MV. Viper. V.21, V.22, V.22bis, V.32, V.32bis, V.Fast Class. FidoNet 3:670/303. 24 hours.

"Oh, no! I should have installed Virus Buster!"

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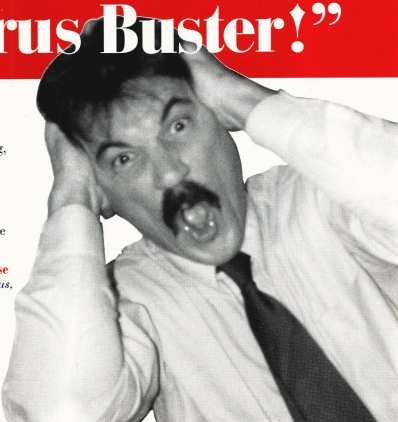
Leprechaun

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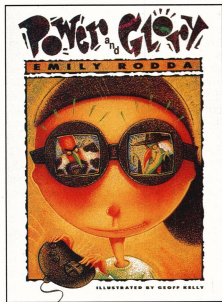
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Hot off the presses

Books and CD-ROMs

*Techno titles, science
fiction from a
systems analyst, easy
Macs, the business
end of the Internet
and more in the
run-down on what's
available for
Christmas.*



Power and Glory

Released in late October, this little gem is an exceptional stocking filler, and a laugh-out-loud ideal gift for children from six to 65.

Beautifully illustrated and cleverly told, it follows the trials and triumphs of a little baseball-capped videogamer whose battles with witches, vultures and goblins aren't half as problematic as the demands on his time from his family. It's no accident that his mother is carrying a broom stick when she interrupts his battle with the witch, or that

it's his father who breaks in on the fight with the ogre. Each time he has to log off (GAME OVER) and then start from scratch. The book leaves him when he finally gets to the end of the game, but we are left with the impression it's by no means the end of the story — read it for yourself to find out.

The engaging aspect to this book is that the little guy is immediately recognisable as the favourite seven-

year-old in every family, for whom getting to level 10 or beyond is almost certainly more important than eating or sleeping and whose mates exist to reinforce his supremacy by posting marginally lower scores and retiring cowed but not defeated.

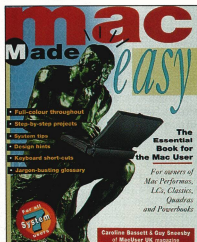
At \$12.95 the paperback is well priced as a temporary attraction, but like other picture books of its ilk, such as the award winning Guess, its appeal is limitless. I've put it on my list to Santa.

Helen Dancer

Author: Emily Rodda
Publisher: Allen and Unwin (Little Ark Book)
Distributor: Allen and Unwin
Phone: (02) 901 4088
ISBN: 1 86373 677 8
Price: \$12.95

Mac Made Easy

(Almost) reason enough to buy a Mac, *Mac Made Easy* is written by two of the writers from UK *MacUser* magazine, Caroline Bassett and Guy Snesby and makes using a Mac look so attractive and easy that even the dedicated PC-ophile might be tempted to change platforms. Following the KISS principle (Keep It Simple Stupid), the book in-



vokes another — SOS (Save Often Stupid). This is one of the light-hearted but sound pieces of advice in this book, which not only deals with the system that confronts new Mac users, but also the most frequently used software, taking Claris Works as an example.

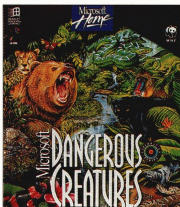
The book concentrates not on how to open a file, save, hold, underscore and so on, but how to create a newsletter or import images and video clips. However, underscoring *et al* is explained along the way. *Mac Made Easy* draws frequent contrasts between itself and the unwieldy tomes which accompany software disks and purport to help the user learn. I couldn't agree more, this book is an excellent introduction. If Santa's bringing a Mac for Christmas, he could do worse than add this little book as a stocking-stuffer.

Helen Dancer

Author: Caroline Bassett and Guy Seneby
Publisher: Allen & Unwin
Distributor: Allen & Unwin
Phone: (02) 901 4088
ISBN: ISBN 1 85797 565 0
Price: \$16.95

The Internet Business Guide

A Net profit for the new year's resolution! If, after one round of yuletide cheer too many, you find yourself resolving in the coming year to turn purposefully onto the ramp of the information superhighway and learn to become Internet-smart, this too-heavy-for-the-beach tome might prove useful in figuring out what to do there, apart from random abuse and worldwide mail drops.



It details in a solid rather than engaging tone, the myriad uses for Internet connections and the many problems, tricks and traps associated with them. The focus of the book is on meeting people on the net so you can sell them products, rather than just finding out what they think about life, the universe and everything. Most net surfers would find this a tad suspect, but the book fulfils this task with cheerful efficiency. My favourite chapter is entitled *The Electronic Schmoose* (oy what a title), a valuable guide to what to do and what not to do. For instance, it advises you to monitor a discussion for at least a week before leaping in to contribute.

Definitely a what-to-do book, rather than a how-to manual, the book will probably be best absorbed away from the office, in some quiet time. However, don't try

taking it too far — it's heavier than grandma's Christmas pudding.

Helen Dancer

Author: Roseline Resnick and Dave Taylor
Publisher: Prentice Hall
Distributor: Prentice Hall
Phone: (02) 939 1333
ISBN: 0672305305
Price: \$39.95

Dangerous Creatures

Microsoft believes that this Christmas, interactive CD-ROM software will be one of the hottest properties in Santa's sleigh. One of the many Microsoft products that Santa will definitely be including for Christmas this year is the *Dangerous Creatures* CD-ROM. *Dangerous Creatures* was developed with the Worldwide Fund for Nature which provided detailed advice on the content and presentation of information on conservation. The fund also receives a percentage of sales of the disc to fund conservation efforts and to protect the world's endangered species and habitats.

This package provides an entertaining and educational involvement with dangerous, as well as endangered, animals around the world. The detail that is shown throughout this package enables children, as well as adults, to have an in-depth look at the world's thousands of species of plant and animal life.

There are more than 250 animals to discover during the journey through the jungles, waters and deserts of the world. This program is informative, educational and entertaining with some interesting live footage of snakes attacking their prey, sharks dominating the sea and cheetahs racing through the jungle.

The CD, with its broad range of games, colour

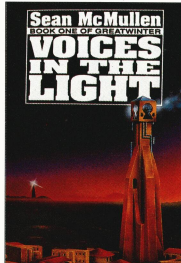
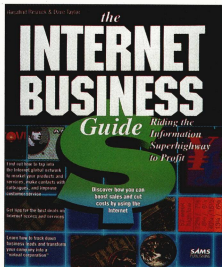
photos, articles, videos and background sounds, captures many dimensions of the world of *Dangerous Creatures*. The realism of the whole package is bound to impress as well as amaze!

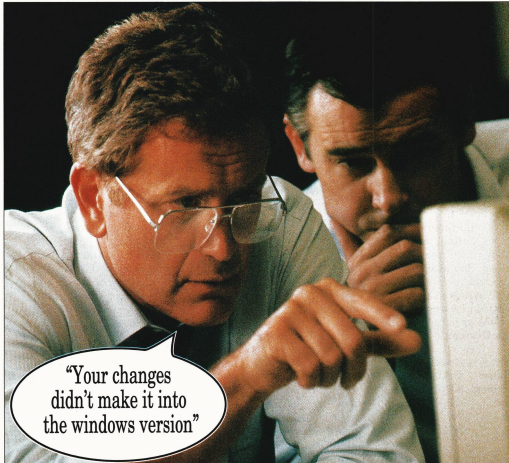
Ashlea Miller

Publisher: Microsoft
Distributor: Microsoft
Phone: (02) 870 2200
Price: \$99

Voices In The Light — Book One of Greatwinter

Voices In The Light — Book One of Greatwinter is a neat synthesis of author Sean McMullen's skill as a computer systems analyst, his work at the bureau of meteorology and recreational pursuits of karate and opera, by being about none of the above. Released earlier this year, *Voices* will no doubt bound down off the swinging racks in airport lounges this summer as you browse and kill time before yet another flight. A more serious cross between Red Dwarf and the prolific writings of Terry Pratchett, it deals with future tech societies, out of control computers and the normal relationship conflicts that flesh is heir to. If you suspect I'd rather be reading Shakespeare, you're right, but this little





"Your changes didn't make it into the windows version"

"Isn't there a software configuration manager that works on all our platforms?"

MULTIPLATFORM TEAM DEVELOPMENT

These days, most applications are built by development teams, working in parallel on one or more LAN servers.

More times than not, the project involves multiple development languages and several different operating systems. As you can imagine, a solid approach to software configuration management (SCM) is critical in this more complicated development world. Automated SCM leverages your entire team and eliminates the feeling of chaos that undermines developer productivity and creativity.

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INTER SOLV PVCS is a family of software configuration management solutions designed specifically for LAN-based development teams. PVCS is ideally suited to today's development

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— John Roskill, Microsoft Visual Basic Product Manager

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paperback, though barely discernible from others of its ilk except by the use of some clever and sometimes obscure allusions, will entertain or at least divert, and above all make even network engineers realise that the tech-nightmare in their life is not as bad as this one.

Helen Dancer

Author: Sean McMullen
Publisher: Aphelion
Distributor: Aphelion
Phone: (08) 267 3798
ISBN: 1 87534 10 4
Price: \$12.95

Create Your Own Multimedia System

The Best Ever Holiday Project! Move the kids off the PC and settle down to Create Your Own Multimedia System. It is a pity that the money-saving coupons advertised on the front cover are all for products in the US which may not prove compatible with Australian systems, but notwithstanding this, and the fact that the several references for assistance are too far away from us to be of any real value, John McCormick's essay on the various pieces required to build the ideal multimedia system makes comprehensive and engaging reading.

Detailing CD-ROMs, MIDI

sound controllers, monitors, input devices and how they all work together and contribute to the overall effect, McCormick builds up a picture of not only how-to but why-better.

It also offers comprehensive guides at the end of each component chapter about the providers of that particular kind of equipment. Again, while it's a useful first step, it is totally America-centric and offers no clue as to whether the products are available and suitable in Australia.

It is an interesting book, but roll on the universal upgrade!

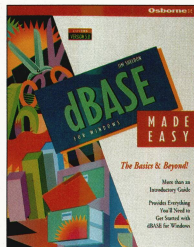
Helen Dancer

Author: John McCormick
Publisher: Windcrest McGraw Hill
Distributor: McGraw Hill
Phone: (02) 417 4288
ISBN: 0 07 46034 5
Price: \$69.95

dBASE For Windows Made Easy: The Basics & Beyond

This book is described as "more than an introductory guide" to using dBASE for Windows. Believe me, it is. Mr Sheldon knows dBASE extremely well, and the book is full of helpful hints and tips to using this classic software in its latest version. While there are many step-by-step examples to follow, it is much more a discussion of dBASE for Windows and what it can do. The author's knowledge of dBASE allows readers familiar with older versions of the software to realise the potential of this new version. Anyone wanting a straightforward training guide, however, may be a little disappointed, as the reader doesn't actually get to start creating a database, or should I correctly say table, until page 48!

From Chapter 4 onwards the reader is intro-



duced to Pacesetter Sporting Goods, a make believe company on which all examples are based. Unfortunately the examples are very American, with Social Security Numbers and back to front date formats. With Pacesetter Sporting Goods, we are taken through the creation of tables, sorting records and making reports right through to adding graphics and, thanks to the Windows environment, sound to your database. I wonder if the author's tongue was so firmly planted in his cheek that he had to create a talking database?

Paul Gasper

Author: Jim Sheldon
Publisher: Osborne McGraw-Hill
Distributor: McGraw-Hill
Phone: (02) 417 4288
ISBN: 0078817927
Price: \$59.95

Rightizing the New Enterprise

This is not a holiday book by any stretch of the imagination, but a deeply serious treatise of one company's experience in rightizing as a lesson to us all. *Rightizing the New Enterprise* — *The Proof Not The Hype* is written

by two Sun Microsystems employees Harris Kern and Randy Johnson and is, at first look, as much a testament to their admiration for CEO Scott McNealy as a book about how and when to rightsize. The author's premise appears to be: when is the right time to rightsize? Answer: when you have a mainframe. It also works on the preformed conclusion that the only way down is onto a Unix platform.

Notwithstanding this evident bias, the book is a useful manual, full of solid reading and helpful checklists, job descriptions and project scheduling layouts. The only graphics in the book are (surprise surprise) screen shots from Sun systems.

Readers who would be happy with Henry Ford's offer of any colour as long as it was black would probably also get by on this one-stop solution. But in an age when rightizing, downsizing and enterprise

RIGHTIZING THE NEW ENTERPRISE

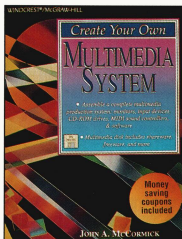
THE PROOF, NOT THE HYPE

HARRIS KERN AND RANDY JOHNSON

reengineering is such a hot topic, it is dangerous to assume or to hypothesise that there is only one colour of anything.

Helen Dancer

Author: Harris Kern and Randy Johnson
Publisher: Sunsoft Press
Distributor: Prentice Hall
Phone: (02) 939 1333
ISBN: 0131321846
Price: \$77.95



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POWER PORTABLE barcode reader?

Well you probably could, but it wouldn't be the right tool for the job.

That's sometimes how it is with computers too. Take portable data collection. You could lug your notebook or palmtop, but with its clamshell case and limited battery life, it wouldn't be durable or convenient.

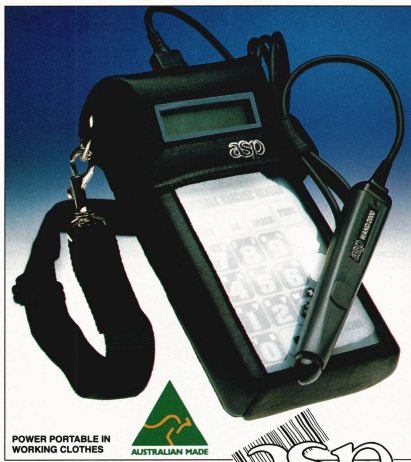
ASP's POWER PORTABLE Barcode Reader is. This tough Australian made tool delivers rugged hand-held and programmable power, with barcode reading capability, and very long battery life. Programs are simply written on a PC in ASP BASIC and downloaded to the POWER PORTABLE along with data if required. The user can be prompted by the POWER PORTABLE's LCD screen, and keyboard entries made as required on the large easy to use keys. The POWER PORTABLE can use barcode Wands or Guns, operate Printers and Modems, and has a special Australian Made protective leather case available as an option. Downloading is simple, either emulating the PC's keyboard in 'wedge' mode, or RS232. The POWER PORTABLE can even be used as a fixed barcode reader, saving investment in additional equipment.

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DOOM II

BY NAT TUNBRIDGE

Let the obsession begin.

Again.



A Mancubus dies on Level 16: The Suburbs



Sequels are rarely better than their predecessor, but in a very few cases the impossible happens, and a new piece of work actually improves on an outstanding original. In the world of film, *The Empire Strikes Back* leaps to mind as the perfect example of a sequel that extended on the plot and characters introduced by the first movie. In games, *Commander II* has been the only program to provide a vast upgrade in playability along with a genuine extension of the theme.

Until now.

To say that *Doom 2* is the most important release in the history of software would be an understatement. This program is on the level of a cosmic event, such as the birth of a new sun, or a star imploding to cause a black hole. *Doom 2* provides us with more death, more killing power, and more horror than ever before. It will obsess you and take over your life, so be

warned, and beware the shocking ultra-violence, which has intensified with this episode. The buckets of gore, the awful traps and the eviscerated and mutilated corpses are all here, but so are some things that are even worse: the fresh horrors. Floating creatures that belch an entire lost soul at a time; terribly deformed monstrosities that shoot fireballs and unbearably evil spell-casting necromancers. Basically, it's business as usual.

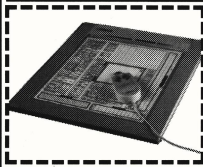


The plot is simple. Having left a swathe of death and blood over the leprous surface of hell itself, I entered the teleporter and returned to Earth, only to find that the creatures had preceded me there. Demon invasion! Billions of humans are dead, and the pathetic remnants of humanity are trying to escape aboard giant spacecraft. Unfortunately, the spaceport has been taken over. The first order of the day is to de-activate the force field surrounding it so humanity can escape.

Beginning at the Entryway, on the edge of the spaceport, I made my way slowly under the building, through the Underhalls and the Waste Tunnels. On the third level, The Gantlet, I encountered the first of the new monsters: the dreaded Former Commando. A step up from the shotgun-toting Former Sergeant, the Commando is the third of the zombie grunts. He's bigger, meaner and totes a chaingun, which lights up his face and body demonically when fired. When killed, this beautifully animated new baddie comes apart, quite literally. A wonderful addition to the cast of villains. In the fifth mission, The Crusher, the title refers to a giant switch-activated masher that could be used to stomp on a herd of Hell Knights. The Hell Knights look and behave just like a grey-green Baron of Hell, but are (thankfully)

MicroGram Computers

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One card with four serial ports and either one or two parallel ports.
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Ideal for use with Notebooks.
Programs up to 8Mb EPROMs
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Allows multiple computers to simply share one or more printers.
Transmission distance up to 450m with the extender models.
No external power supplies are required.

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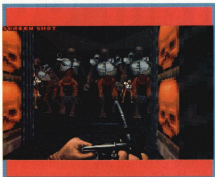
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easier to kill. The Crusher also introduced another, entirely new, evil: the Revenant. A wiry reconstructed demon with double missile launchers wired to his shoulders. Note I said missile, not rocket. The Revenant's missiles don't just fire straight, they seek you out, and to break the target lock you'll have to hide behind a wall or strafe to one side very quickly. I found these vile creatures died quite easily, thrown backwards gouging blood, if I could avoid the missiles.

By the time I encountered the Revenant, I was regularly using the new weapon that appears in DOOM 2: the combat shotgun. It's a double-barrelled, sawn-off killing stick. These gats are the ultimate in pellet warfare, as the manual advises, but do take a bit longer to load, as is illustrated by a nice sequence that occurs after each shot, showing your virtual soldier cracking open the gun's barrel and slamming in two new cartridges. The shotgun was particularly useful against the next new monster to appear, the terrible Pain Elemental. Looking like the Caco-demon's smarter brother, the Pain Elemental vomits Lost Souls and floats around horribly. Even when killed, he explodes, producing three more flaming skulls! Against this beast, no amount of reasoning will work; death is the sole and only argument.

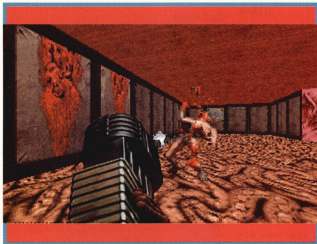
In the seventh mission, an intermission screen appeared telling me that the starport's technology had been subverted by the monsters. An outpost of hell, a fortified zone, had been set up to block my advance. This was not as Dead Simple as the title suggested, mainly because of the two new beasts that were populating the fort. The Mancubus is the best of the new creatures; a giant, pinkish-grey obscenely blubbery horror, whose arms end in fireball tubes. Not only does he pump fiery spheres out in fast groups of four, but he fires them in an unpredictable pattern, so that dodging to the left or right may actually take you into their path! The gory death sequence of the Mancubus sees him viciously lobotomised, then collapsing in on himself. Once I killed five of these nasties, the walls opened and in poured the Archons! Mini-versions of the infamous Spider Demon that closed DOOM 1, these are small, fast and each equipped with a high-powered plasma gun; a very tricky customer indeed, although the cure for their manic enthusiasm can be found in three blasts of the double shotgun.



Meet the Revenants!



The new combat shotgun is very powerful.



Using the eplasma gun on an Arch-Vile.



Meet the Mancubus.

After blasting my way through the fort at level seven, I was required to continue my progress into the starport. There was an even tougher challenge at level eight, which is called Tricks and Traps. Starting from a single octagonal room, with doors in each wall, I had to overcome a herd of Barons of Hell, a Cyberdemon, several hordes of Imps, a sea of Demons and oceans of zombies to fight past this one. At times the floor was totally obscured by the broken bodies of the unholy. After the horror of The Pit and the hideous Refuelling Base, I was able to deactivate the force



field and let humanity flee. To save myself, I now had to fight my way through the infested city to escape.

Up to this point I had found DOOM 2 quite straightforward, even easy in parts, but as I began to advance through the devastated city, beginning at the level called The Factory, things rapidly became more difficult. It started with the increasing appearances of the shocking Arch-Vile, the worst of the new creatures, who casts spells and resurrected dead beasts. His echoing, breathy laugh is the spookiest sound I've ever heard in a game. He moves almost too fast to hit, and doesn't fire missiles. Instead he performs a little ritual,

Continued on page 289

THE MAGAZINE FOR PC BUYERS

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DECEMBER 1994

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Helpline 8

PC SuperMarket's reader service for locating computer products.

News 9

PC SuperMarket looks at InfoExpress and shopping via CD-ROM; NEC's quad-speed CD drive; Harvey Norman's Christmas offerings; and Microsoft's Home Brand.

New and Improved 10

Announcements of new products and upgrades.

Price Watch 20

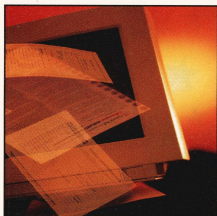
There are massive savings on mobile phones on at the moment with both suppliers, retailers and carriers offering huge discounts. The Price Watch team investigates the hidden costs involved.

Correction

In last month's Company Profile, AMS Australia was wrongly named as Australian Micro Systems. The company reviewed was actually Applied Micro Systems. Australian Micro Systems is a Canberra-based company which can be contacted on (06) 257 5733. We regret any inconvenience to our readers and the companies involved.

Warranties 32

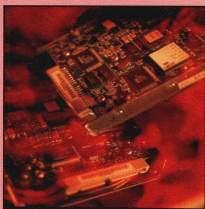
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SHOPPER'S GUIDE

Vast and fast 52

Hard disk drives are getting cheaper and faster. This month, *PC SuperMarket* reviews six hard disk drives which use the new IDE standard.



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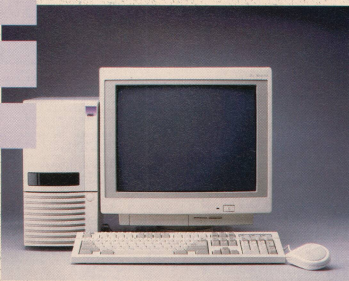
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COMPUTERS THAT SIMPLY GIVE YOU MORE

More performance, more quality, more service, with additional features not found in other systems. The MaxCom Computer is ideal for the professional Windows user, with accelerated graphical performance and high quality display screens making it a Windows Dream Machine! It's suitable for everything from single user office applications to the most powerful multi-user networking environments. CPU upgrade are simple and cost effective. By replacing or adding a CPU chip you get up to 486DX/4/100 Mhz performance. The latest Pentium technology is also available.



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Call for pricing on installing Novell Networks in your office.

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KEY: G - Game R - Reference C - Children E - Educational
M - Music A - Arcade F - Fantasy/Adventure S - Simulator

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Please be aware that this service is not a direct phone inquiry service, nor do we recommend products or diagnose computer ills through the mail or by phone.

APC reserves the right to publish any correspondence addressed to Helpline.



I am in the search of target mail directory software. I have heard of a product called Australia on Disk, but I do not have a clue of its publisher or distributor. I would appreciate any information you can provide.

Yan Chen

There are a couple of programs that we know of that are called Australia on Disk (or Disc). One is distributed by Read Only Memory, which can be contacted on (02) 564 7400. Australian Strategies Corporation (phone (02) 979 8518) distribute Brylar's Australia on Disc.



I am looking for the distributors of a product called Winprobe.

Ester Zazzaro

Winprobe is a diagnostic program. We know of two distributors — Interworld Electronics and Computer Industries (phone (03) 563 5011) and Landmark PC Diagnostics and Utilities (phone (03) 848 9764).



Many years ago there was an extremely useful program called PC-Alien that could read disk formats from many and varied machines. Is this program still being developed? Who is developing it?

Cameron Donnelly

While we doesn't know if the program is undergoing further development, we can inform you that PC-Alien is available from Canberra-based FBN Software. Phone (06) 285 2218.



I would be grateful if you could supply me with some information on hard disks. I work for a mining company in WA and we have about 50 computers onsite. A number of these are experiencing problems with disk capacity, and I envisage that we will need to look at upgrading some hard

disks. I receive APC and have not been able to locate any information that might help me to decide on what type of hard disk to buy. Reliability, support and a reasonable price are probably my main considerations.

Frances James

The hard disk market is very competitive and any information more than three months old is bordering on obsolescence. The main feature in PC SuperMarket is on IDE hard drives and should be of interest.



Could you please advise if you can help our company locate typical software packages suitable for estimating purposes within an engineering/manufacturing business.

Wayne Hinchcliffe

The APC Software Buyer's Guide 1994-95 is available from newsagents now. It provides a directory of software products categorised by application. There is a section on engineering/manufacturing.

Can you help?



I am trying to locate distributors of OSBackup and Backup Pro produced by Magic Box Software. Can you help?

Flora Varnevsky



Could you please help with the name of the distributor or importer of the Sweet-P scanner. It was manufactured in the US by Enter Computer. The line voltage seems to indicate that it was made for an Australian power supply as it is 230 volts. I need to get an interface card for it as it is a proprietary interface.

Ken Jones

If you can help with any of these inquiries, please contact Helpline and we will forward the information on.

Shopping revolution: Buying from CD-ROMs

**BEST
BUYS**

Buying a CD-ROM for Christmas might offer you more than an entree into a world of fun interactive games and music video. These are all very fine, and Christmas offerings from most of the major vendors are totally spellbinding — see below — but InfoMagic has other designs on your PC.

The newly released InfoExpress CD-ROM shopping plan could see CDs beat the television set to interactive shopping. InfoMagic has just released a CD catalogue of 2,000 computer products from 53 suppliers. Computer products are a logical first step, because that's what buyers in this medium understand, but plans are underway to widen the scope, and offer CD-ROM catalogues on commodities as diverse as toys and stationery.

The plan has been bolstered by a buyout of the company by Unisys Australia, which will provide a valuable injection of funds to invest in modifying the program for other industries. InfoExpress will be owned by a new company to be called InfoMedia.

The initial plan will now undergo in-depth testing with 10,000 regular customers who will read the electronic brochures, view demonstrations and read product reviews, before making their orders. The company is undertaking to provide 48-hour delivery on products ordered this way.

For more information, contact InfoMedia on (02) 930 3900.

Helen Dancer



The InfoExpress CD-ROM shopping plan.

Four-speed CD-ROM in time for Christmas

Santa's helpers could wake to find a quad-spin CD-ROM drive in their stockings. NEC has called the new drives the MultiSpin 4X series, and offers either internal (4Xi) or external (4Xe) models, both with 256K cache and NEC's Ergo Design features, notably a MusicSensor which eliminates the need for music playback software, rotating double dust doors and automatic lens cleaning.

The NEC MultiSpin drives are priced at \$949 for the 4Xi and \$1199 for the 4Xe, and will be available for the Christmas market.

For more information, contact NEC Home Electronics on (02) 868 1811.

Helen Dancer

Hey Harvey Norman — you got me!

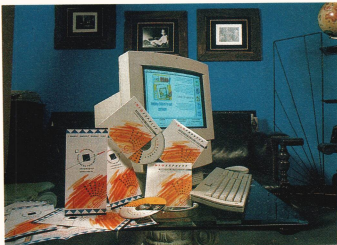
Whether it's because of television advertisements, pamphlets in the mail or from

visiting the stores, there is no question that most people today are familiar with the name Harvey Norman. Harvey Norman is now a major force in computer retailing, averaging a turnover of \$20 million per month, according to the company's own estimates. With 14 computer superstores, and five mini superstores, Harvey Norman is still expanding, building a reputation for service, quality, lower pricing and regular specials.

Gerry Harvey, founder of Harvey Norman stores, claims that specialised service is the key to his success, with a staff mix of technical skills and sales experience for the most congenial and profitable environment.

The company's success is also notably due to its strat-

continued on page 16



The new MultiSpin 3Xp Plus and 4Xe CD-ROM readers.

New & Improved

NEWS OF ANNOUNCED PRODUCTS AND UPGRADES

By Ashlea Miller

NEW

Thinking, serving and topping

IBM has announced additions to the ThinkPad, PC Server and PC Desktop range. The new ThinkPad 755CD has a built-in CD-ROM, stereo speakers, and advanced video and television integration, while the ThinkPad 755 has infra-red file transfer capabilities, built-in high speed fax modem and telephone with answering machine.

The PC Server 500 has an expandable 90MHz Pentium processor and is available in a three array or three non-array models with or without hard drives and SCSI-2 Fast/Wide controllers.



ServerGuide 2.0 is a CD-ROM tool that installs, configures and tunes network operating systems.

By using common parts and technologies, the desktop range includes the PC 700 Series including Selectabus, which supports either MicroChannel or PCI architecture. The 700 Series includes Intel 90MHz and 100MHz Pentium processors and high performance 364M or 540M hard drives with optional 728M or 1G hard drive. The PC 300 series also includes the Selectabus and the 60MHz

or 100MHz Pentium processor.

Contact IBM Direct on 008 815 154 for more information.

NEW

Toshiba's CD on the go

SCSI Corporation is distributing the Toshiba Portable XM-4100A. The 0.45kg CD-ROM drive has a data transfer rate of 300Kps and a 64K cache buffer. The Toshiba Portable interfaces with SCSI and SCSI-2 and has auto switching/auto power down energy saving features. The CD-ROM drive is priced at \$821.00 and includes a 12 month warranty.

Contact SCSI Corporation on (02) 894 6033 for more details.

NEW

Lead towards Persuasion

Adobe Systems has released Persuasion 3.0 for Win-

dows, offering cross-platform graphical software for creating and managing slides. Persuasion 3.0 features a redesigned user interface with new colour models, graphics tools and dozens of new or redesigned features. The key features include galleries of slide and chart styles, slide masters, a large selection of chart formats, colour modes, precision element alignment and improved layering control.

Persuasion 3.0 is now available on three major platforms: Macintosh, Power Macintosh and Windows, serving all three markets. It costs \$695. Upgrades will be available for \$195.

For more information contact Adobe Systems on (02) 418 8488.

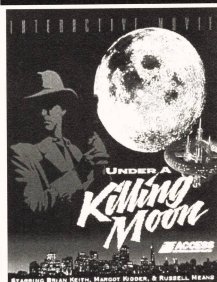
NEW

Dataplex running on low power

The Australian designed and built DPX-213 from Dataplex uses normal mains power, battery, solar panels or any other low power source.

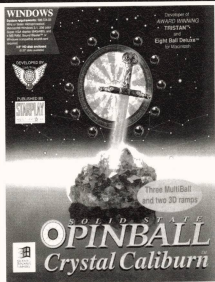
With alternate alarm dialling and dialback pass-

CHRISTMAS SPECIALS



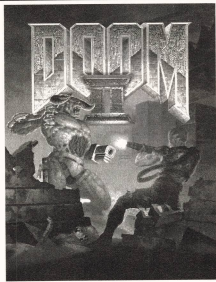
Under A Killing Moon
An interactive 3D experience that sets a new standard for realism. CD-ROM only.

Was \$99.95 **now \$79.95**



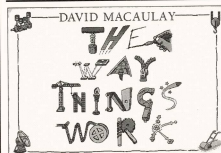
Crystal Caliburn
The most realistic pinball game ever. Three multiball & two 3D ramps. Floppy only.

Was \$79.95 **now \$69.95**



DOOM II
The biggest baddest DOOM ever. Deadlier weapons, networkable. CD-ROM or Floppy.

Was \$99.95 **now \$75.00**



New Educational CD Titles
The Way Things Work allows children from 7 to 70 to explore 200 different mechanical objects and see how they work.

Was \$119.95 **now \$99.95**
My First Incredible Amazing Dictionary is an introduction to 1000 words and their meaning for children aged 3-7.
Was \$79.95 **now \$69.95**



PC Cricket FEATURING: Full field animation with colour graphics and continuous play • Digitized sound effects • All major international teams • Define your own teams • Player statistics & milestones recorded as you play • All standard statistical and graphical displays provided
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BEST BUYS



word protection, the DPX-213 is ideal for security applications. Other features include MNP4 error correction and MNP5 data compression; 300 to 9600bps constant speed interface; remote configuration; non-volatile configuration and phone number storage; synchronous and asynchronous operation — link selectable; auto dial and auto answer; help and status screens; LED operation (link selectable) and an extended AT command system. Prices start from \$385.

Contact Dataplex on (03) 210 3333.

IMPROVED

Get the picture

Micrografx has announced Picture Publisher 5.0, the

first image editor to offer extensive OLE 2.0 support including drag-and-drop and in place activation. Optimised for Windows, Picture Publisher is designed to work best with a 486-based PC with 8M of memory, although it will run on 386 machines with 4M of RAM.

Improvements include extensive keyboard shortcuts, tool specific right mouse button menus, and a full macro recorder. The package also introduces an innovative Command List, which allows the user to have the ability to 'layer' any command, whether by reordering, inserting or altering procedures.

Picture Publisher 5.0 retails for \$795. For users who wish to upgrade, or cross-grade from PhotoPaint, PhotoStyler or PhotoShop, the upgrade costs \$245 and is available only until January 31, 1995. For more information contact Micrografx on (02) 415 2642.



NEW

HP ScanJet 3p

Hewlett Packard has announced the HP ScanJet 3p desktop scanner, a low-cost, flatbed, greyscale scanner.

The \$995 ScanJet 3p is a 1200 dots per inch (dpi) enhanced-resolution and 300dpi optical resolution flatbed scanner and performs up to 30% faster than its predecessor for page scanning applications. It delivers complete image, text and copy solutions for business professionals and others who need to incorporate images and editable text into documents.

Contact Hewlett Packard on 131 347 for more details.

NEW

You can ring Packard's Bell!

Packard Bell has launched a range of designer PCs, Pentium and 486 processor-based systems. All feature a new sculptured monitor with speakers mounted directly into the side for a sleek and stylish look, as well as for the enhanced acoustic.

Designed especially for multimedia, the systems have an integrated stereo amplifier with tone and volume controls. For simple set up, colour-coded connectors

have been included for hooking up the keyboard, mouse, monitor and other peripherals. The multi-function technology includes a hard drive IDE interface to local bus; Plug and Play compatibility; expandable video memory; local bus video; flash BIOS; and a password system.

The multimedia models feature a dual-speed CD-ROM drive, including a 16-bit stereo sound card with Sound Blaster compatibility.



The software packaged provide uses for personal productivity, business, entertainment, reference and online access.

Prices start from \$1,835. Contact Packard Bell on (02) 317 4366.

NEW

Quality and 'Value'

Lexmark's ValueWriter 600 is suitable for corporate users who need a high-quality, high volume output personal printer. It offers speed of five pages per minute at 600dpi and features PCL 5 emulation and compact size. Electrophoto-

EUREKA!

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- 586 Pentium 60MHz CPU-1st Grade Heat Resistant PCB.
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- Pentium In-Built Maths-Co Processor with 16 KB 1st level cache.
- 512 KB Write Back Quick Write SRAM CACHE.
- 4 x PCI Bus Slots, 4 x ISA Slots Actual PCI 64 BIT Upgradable Motherboard.
- Shadow RAM For 300% Faster Graphics.
- 8 MB RAM Japanese 72 PIN 70 NS Based Expandable RAM.
- 1.44 Floppy Disk Drive.
- 340 MB CacheSpeed V/Coil Hard Drive.
- AMI Phoenix Legal BIOS with Password Protection.
- FCC/TUV Approved Power Supply 200/230w.
- 1280 x 1024 Resolution, 16.8 Million Colours.
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- Tinted-Non-Glare Japanese Tube 0.28 Dot Pitch, Pincushion Control.
- 2 x Serial Ports, 1 x Parallel Port, 1 x Games Port.
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BEST BUYS

NEW World first!

Maxtor Corporation has released the world's first 1.8in hard disk drive,



designed for 5mm Type II PCMCIA slots. The Mobile-Max 121 Hard Drives feature capacities of 105 (\$496) and 131 (\$526) megabytes, and are the first hard disk drives to feature

3.3 volt operation for lower power consumption and a non-operating shock specification of 1,000Gs needed for mobile computing. The drives are suitable for a range of very compact systems, such as handhelds, palmtops, electronic entertainment or automotive information systems.

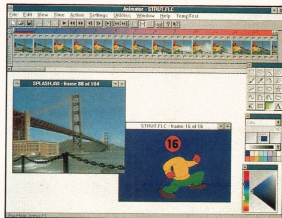
For more information, contact Liberty Electronics on (02) 736 1710, or Maxtor on (02) 369 3662 for your local distributor.

NEW

Calling the toon

Autodesk has announced Animator Studio Release 1, a Windows 3.1-based successor

to Animator Pro. Autodesk Animator Studio (\$995) is the only Windows-based professional-level software tool that gives graphic artists a graceful transition from still-image editing and paint tools to an integrated paint, anima-



tion and audio editing suite.

Features include 24-bit paint/animation; Truecolour paints and 2D animations with anti-aliasing and alpha channel; transparency on all tools; open multiple animations simultaneously and cut/paste between them; draw, paint or air-brush on top of digitally captured images; use the Freehand Sprite tool to paint with a multi-frame animation or captured video; and/or paint on frames like a cell animator.

A set of backgrounds, animations and sound clips is delivered on a CD-ROM with this product, allowing consumers to view, edit and use for inclusion in their productions. Contact Autodesk Australia on (02) 844 8000 for more information.

NEW

Succumbing to the Apple

Apple has introduced the LaserWriter 16/600 PS, a PostScript laser printer for workgroups with any combination of Macintosh, Power Macintosh, Microsoft Windows, DOS and Unix computer systems. The (\$4,495) LaserWriter 16/600 delivers printing at 16 pages per minute on A4 size paper at 600dpi resolution. This printer also includes optional support of Photo Grade for greyscale image enhancement. Another option is a fax card which can exchange faxes with any standard

Group III or PostScript fax machine, from both Macintosh and Windows computers. Faxes received are printed on plain paper at up to a 600dpi resolution. With the LaserWriter 16/600 PS, users can print from a database directly onto envelopes. This product also includes 64 Apple fonts and 8M of RAM (expandable up to 32M).

For more information, contact Apple Computers on (02) 452 8000.

IMPROVED

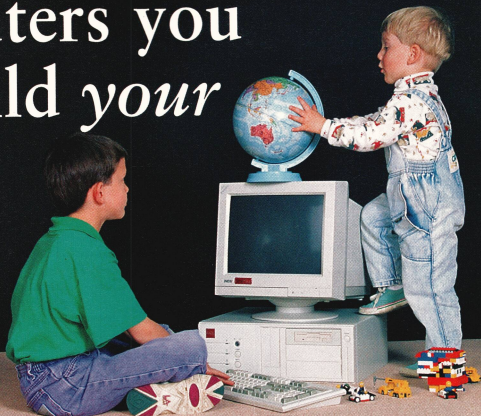
Data easy software

DataEase Australia has announced the release of DataEase for Windows 5.0. Based on the feature set of DataEase 5.0, additional features include a one keystroke migration of any DataEase 5.0 application into DataEase for Windows 5.0. Once this migration has taken place, both DataEase products will allow users to access the application by both DOS and Windows workstations.

The benefits with this package will be the ability to create views over tables, built-in graphics support, six times the speed increase in sort and search functions, ability to move between applications without having to exit DataEase first and automatic reading of dBASE and Paradox tables. Both DataEase 5.0 for DOS (\$1,275) and DataEase for Windows 5.0 (\$795) will provide the integration and migration facilities.



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BEST BUYS

Contact DataEase Australia on (02) 955 8288 if further information is required.

IMPROVED

Finding your way around — cheaply!

Hearne has lowered its prices on its Atlas line of desktop mapping software and development tools, including Atlas GIS. Atlas GIS for Windows, which previously sold for \$2,950 is now available for \$795 for a single user. Users of MapInfo

for Windows can cross-grade to Atlas GIS for Windows for \$450. Hearne has put together a pack of boundary files and data consisting of geographic detail, postcode boundary files, demographic data and sample street files.

Atlas GIS for Windows 2.0 offers built-in SQL connectivity for users in client/server and workgroup computing environments. Key presentation features include multiple map insets, a customisation toolkit based on Microsoft Visual Basic and advanced geographic analysis capabilities.

Contact Hearne Scientific Software on (03) 602 5088.

NEW

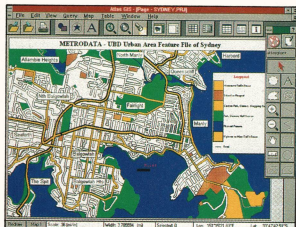
High speed modems

Avtek Data Communications has announced the availability of a new range of high per-

formance modems. The new products consist of a 28,800bps modem for \$499; a 14,400bps data/fax modem for \$299; and a data/fax/voice modem from \$349.

The MegaPlus Fax 28.8 is a fully featured desktop data/fax modem with support for all modem speeds from 300bps up to 28,800bps. The modem supports full error correction (MNP4, V42) and data compression (MNP5, V42bis) providing a maximum terminal speed of 115,200bps. The new Mega DataFax 144 offers new hardware technology, combined with Windows communications software Cooee V1.2, provide all data and fax communications up to 14,400bps. Error correction and data compression is enabled via the communications software.

Contact Avtek on (02) 888 5333 for more information.



from page 9

egy of selling bigger brand names in the market, relying on market leaders such as Apple, Compaq, IBM, and Olivetti in the computer field, in the same way that reliable brands such as Hoover and Kenwood have brought the company success in other consumer arenas.

New for Christmas is Compaq's latest Presario range which features simple set up, inbuilt fax modem and answering machine, integrated text, pictures, animation, video, CD-ROM and stereo sound. The range is Compaq's latest offering to the burgeoning home user and small business market. Prices for the Presario start from \$2,499. Contact Compaq on (02) 911 1999 or Harvey Norman on (02) 647 2611.

Harvey Norman is also offering a Pentium PC for

under \$3,000. The Acer DT Pentium has 8M RAM and a 420M hard disk and will sell for \$2995.

Ashlea Miller

Microsoft at home for Christmas

This year for Christmas, Microsoft has released a range of products for the whole family. The 'Microsoft Home Brand' includes titles which have been developed for enjoyment and educational purposes, directed at both adults and children. The 40 titles currently available for families are expected to grow to over 100 new products within the next year.

Recognising the growth of the home personal computer market, Microsoft has de-

signed these products for the consumer. Each product has been researched with families, teachers, and academic experts to ensure accurate information, learning capabilities, and simplicity of access to the information.

Targeting adults, Microsoft has included basic word processing capabilities in the software bundles to assist with the management of home financial records and mailing lists as well as helping users produce newsletters, calendars and brochures from home.

The titles developed for children, including Dangerous Creatures, Ancient Lands and Dinosaurs, are interactive and have been designed to support children's education. With the use of sound and video facilities featured on some of the software, children are able to learn through seeing

realistic pictures and actions, as well as through hearing and reading the text, and playing learning games.

The Home brand has a package for everyone, from tools such as an encyclopaedia, an atlas and a thesaurus to a series of guides to the world's greatest composers, providing both the music and text-based information on Strauss, Beethoven, Mozart and Stravinsky.

Microsoft wants to turn your home computer into a reference library, or your home office into an entertainment centre. The depth of content, sound and visual quality that each Microsoft package offers is designed to impress, entertain and educate.

For more information contact Microsoft on (02) 870 2100.

Ashlea Miller

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Response 3434

BEST BUYS

If there is one retail area expanding more rapidly than the computer industry, it must be the mobile phone industry. With over 1.3 million now in use, and new mobile phones being signed up across the nation at a rate of 10,000 per week (over four a minute), the chances are you will want to buy one soon. Prices are also tumbling, with a full feature digital now available for only \$199 — less than one fifth of last year's analog models.

PRICE WATCH

The falling price of
mobile phones.

Standard analog models can now be had for under \$500, and many suppliers offer free connection to the service. Standard service rentals go down as low as \$10 per month, and call charges to 10c per 30 seconds.

The options for new phone buyers fall into two categories: which type and which company. Which type means digital or analog, and which company means Telecom or Optus for analog and Telecom, Optus or Vodafone for digital.

The difference between analog and digital is simple. Analog is better in terms of current coverage, worse in terms of overall quality and services. Digital is better in terms of clarity, battery life and services, currently worse in terms of coverage. The government has decreed that digital GSM (Global System for Mobiles) will be the system of choice by 2000

with analog phasing out after 1996. So from most points of view digital will be the one to go for. However, if you live in a rural area, don't need high-speed data links and can afford to change systems in a few years, analog will still probably do the job better.

Company wise, the choice is more complex. Telecom is the big player. They set up the analog system, operate it for themselves and rent out space on it to Optus. Consequently Optus and Telecom have virtually identical analog coverage, and although there is a bewildering array of TV adverts that will tell you otherwise the average charges for average users are about the same. Providers can be swapped as and when you want. Digital is another story.

All three players — Telecom, Optus and Vodafone — are setting up and building their own digital base towers across the country in the areas they think are most effective. Consequently, the coverage currently available varies considerably, even from street to street within CBDs. In (very) general terms, Telecom probably has the broadest digital coverage, with Optus and Vodafone slightly behind it. However, availability in fringe and outer metropolitan areas is still poor. Most digital contracts are for one year minimum.

Our charter and method

Price Watch is an interesting exercise in comparative technologies, relative prices and human nature. All investigations are conducted anonymously, and conversations are annotated. Prices and system capabilities printed here are provided by the sales staff at the offices we contacted, and all information is as supplied. While we assume that these are correct we cannot accept any responsibility for errors or omissions. Neither will we be held to account by companies mentioned here for omissions to product ranges or system capabilities. The responsibility rests with sales staff to provide adequate information, as the company would expect them to do with every customer.

Although provider and medium are important, the services offered are also central to any phone user. All providers can offer services such as call diversion, holding calls, voice mail and paging on the digital services. Call rates depend on the type of service selected, the distance called (Vodafone excepted) and the time of day. Telecom and Optus also offer different charge rates for those calling mostly locally or mostly interstate. To add to the confusion, Optus and Telecom also reward the caller for making calls over a certain cost by giving points back as credit. The only generalisation here is that most contracts run for 12 months, but watch out for

some which run for 15 months. This can be a disadvantage if you want to change company. Check also for extra charges that you may or may not use such as overseas roaming, directory services or paging.

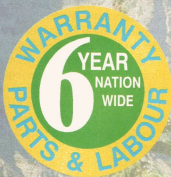
In terms of the phone itself, the main points are easier to define. The first is obviously price. Other important factors are weight, size, clarity, reception, battery life, recharge time, display, format and warranty. Ideally, a thin pocket-sized phone with low weight, long battery life and short recharge, a good speaker, a legible display and two years' warranty would be ideal. Many new mobile phones are now being simplified

considerably after a techno-rush of options. This is because most users want to simply ring out, take calls, divert, take messages and remember numbers. Many other functions are rarely used by most owners. The other sweeteners being added to the deal (mainly in the digital area) are subsidies on the cost of the phone, free connection charge, and reduced access fees for the first months. All these will influence which phone to opt for, but remember you are not just buying a handset. You are buying a service, especially with digital phones where you usually sign up for at least 12 months, so look carefully before you commit.▲

MOBILE PHONES

Phone	Supplier	Type	Weight (g)	Talk time (min)	Display	Extras	Conditions	Price
Ericsson GH198	mobile INNOVATIONS 1 800 807 878	Digital	325g	60	Two line LCD/pager	N/A	\$50 calls/month for 12 months, \$65 connection fee	\$199
SMS MiniMax	Technotronics (03) 525 4872	Analog	245	180	Three line LCD	Portable hands-free kit	N/A	\$1350
Nokia 2110	Fone Plus (03) 645 3066	Digital	235	70	Four line LCD/pager	Free connection	12 months contract	\$995
Motorola Micro 5200	Communications Warehouse (03) 429 2288	Digital	315	120	Two line LED	Free connection	12 months contract	\$399
Ericsson AH237	TeleCell (02) 247 4411	Analog	205	60	Two line LCD	N/A	N/A	\$895
Samsung SH400	RetraVision (03) 783 7977	Analog	279	50	Two line LCD	Strap	N/A	\$799
NEC P310	Brashts (03) 654 6544	Analog	350	100	Three line LCD	Free connection, spare battery	N/A	\$749
Optus N1000	Let's Talk (02) 809 0944	Analog	300	65	LCD display	N/A	N/A	\$665
Evolution	Normad (02) 728 2288	Digital	280	80	Four line LCD/pager	Spare battery	12 month contract	\$799 (\$399 if heavy/regular user)
Voxson 999	Strathfield Car Radios (03) 427 8188	Analog	235	60	Three line LCD	Spare battery	N/A	\$599
Motorola Pocket Phone CA 52115	Harvey Norman (02) 419 6133	Analog	315	55	LED	N/A	N/A	\$399
Audiovox MVX700	Cellphone 131 251	Analog	175	70	Two line LCD	Case, spare battery	N/A	\$999

*N/A - Not applicable



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fied with your purchase**

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contracts to purchase in
the future**

**Warranty insured by
MMI Insurance for absolute
"Peace of Mind"**



Pentium Multimedia

Pentium WinStation

- Intel Pentium™ 60/66 MHz - 16Kb 1st Level Cache
- 512Kb 2nd Level Direct Mapped Write Back SRAM Cache
- 2 x VESA Slots, 7 x ISA Slots, 6 Layer 1st Grade PCB
- Superscalar Architecture with 64 bit Databus
- AMI BIOS, 586 Burst Mode, Password Protection
- 8Mb Fast 72 Pin RAM Expandable to 256Mb on Board
- TEAC 1.44 Mb 3 1/2" Floppy Disk Drive
- **Conner 420 Mb ProSpeed Cached Voice Coil Drive**
- SpeedPro VLB Hard Drive Accelerator
- VESA 1Mb VLB X/SVGA Graphics Accelerator
- 1280 x 1024 Res 16 Million Colours 75Hz Non-Interlaced
- Compu MultiScan X/SVGA High Res Colour Monitor
- Non-Interlaced Tinted Non-Glare Japanese Tube 0.28 Dot
- Compu Deluxe Desktop or Mini Tower - RFI Shielding
- FCC Approved - 200W TUV & SA Approved Power Supply
- Honeywell 101 Key Silent Tactile Ergonomic Keyboard
- Compu Power Surge Professional Protector Cable
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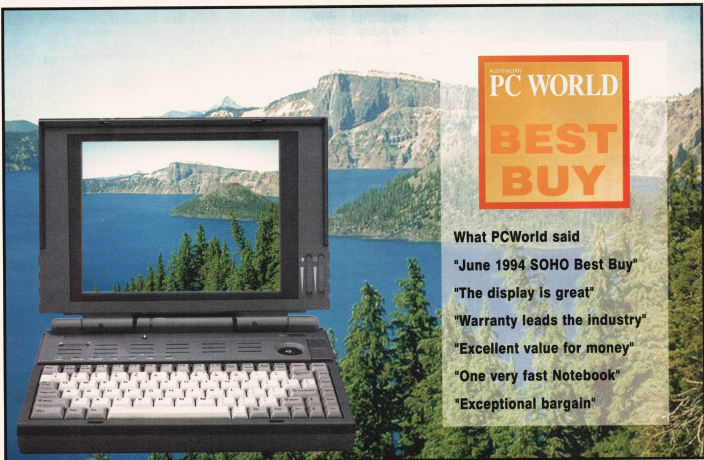
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"June 1994 SOHO Best Buy"

"The display is great"

"Warranty leads the industry"

"Excellent value for money"

"One very fast Notebook"

"Exceptional bargain"

Multimedia featherweight

MultiMedia NoteBook

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- 486 Math Co-processor
- **Upgradable Memory** 4 Mb FastRAM expandable to 32 Mb
- 1.44 Mb Japanese Floppy Disk Drive
- **Upgradable Hard Drive** 210 Mb to 510 Mb
- **Upgradable LCD Screen**
 - 10" 64 Grey Scale Monochrome Passive Matrix
 - 10" 256 Colour Dual Scan Enhanced Passive Matrix
 - 10" 512 Colour TFT Active Matrix
- 1024 x 768 High resolution CRT Support
- Turbo Bus - 400% Faster Graphics Speed
- Built-in 16mm High Performance Trackball
- PCMCIA Expansion Slot - Fax/Modem/Ethernet
- MultiMedia Sound Card - valued at \$350
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"At a reasonable price the XPRESS has a lot to offer"

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"Offers great buyer confidence"

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- 4 Mb System Memory Fully Upgradable
- Internal 3 1/2" 1.44 Mb Floppy Disk Drive
- 120 Mb Voice Coil HDD Upgradable to 510 Mb
- 10" 256 Colour LCD at 640 x 480
- 80 Key Low Profile Keyboard
- 12 Function Keys and Embedded Numeric Keypad
- 1 x Serial Port & 1 x Parallel Port for Printer or External FDD
- External VGA Monitor Port & External Keyboard Connector
- Intelligent SMI Power Management Features
- Dimensions 279 x 219 x 40 mm - Ultra Lightweight 2.3kg

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The Computers Listed Below Are Only Used As A Guide. We Build Systems That Suit Your Particular Needs And Budget. Please Contact Us So We May Discuss Your Requirements.

Cards	Business	Mice
AT/IO (2S, 1P, 1G)	19	310
AT/IO (2S, 1P, 1G) Cont	120	310
IDE HDD / FDD	19	300
AT/IO & IDE / FDD	25	395
VLB IDE VIO 2S, 1P, 1G	35	395
VLB Cashed IDE	250	690
NE2000 LAN Card	60	155
Floppy Controller	115	155
ENHANCED VLB CNT	110	170
		480
		540

VideoCards	310	395	550
1MB Trident	105	110	150
1MB WIN Accel	110	130	150
1MB VLB Trident	130	140	150
1MB VLB WIN Accel	140	150	150
2MB Tseng W32P VLB	395	495	550
1MB Speedstar Pro	220	230	250
2MB Diamond Stealth 32 VLB	380	390	400
2MB Diamond Viper VLB	710	720	730
4MB Diamond Viper VLB	960	970	980

Cases	310	395	550
Desktop 200W Led	70	75	80
Mini Tower 200W Led	70	75	80
Middle Tower 200W Led	120	125	130
Full Tower 220W Led	140	145	150

Hard Drives	310	395	550
212MB 14MB WD	270	280	290
270MB 14MB WD	390	400	410
340MB 14MB WD	340	350	360
425MB 12MB WD	360	370	380
540MB 12MB WD	450	460	470
730MB 12MB WD	600	610	620
1.08GB 12MB WD	880	890	900
210MB 13MB Conner	270	280	290
340MB 13MB Conner	340	350	360
425MB 13MB Conner	340	350	360
540MB 12MB Conner	450	460	470
810MB 12MB Conner	700	710	720
1.08GB 12MB Conner	880	890	900

Accessories	310	395	550
Upgrade 250M - 450M 720	70	75	80
Upgrade 4M - 8M	435	440	445
Locking Station	435	440	445
Internal Fax Modem	170	175	180
2 Bit Sound Blaster	200	205	210
pare Battery	180	185	190

Memory	310	395	550
MB x 3 SIMM -70 Ns	55	60	65
MB x 9 SIMM -70 Ns	200	205	210
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486DX40A 256C CLK VL 445	110	115	120
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INTEL 486-DX266 CPU	340	345	350
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INTEL DX4-100 CPU	CALL	CALL	CALL

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CANON BC 600	1100	1110	1120
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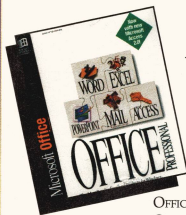
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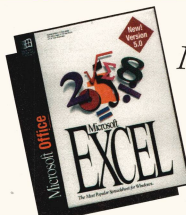
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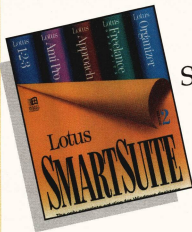
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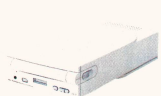
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Warranties

— the

inside story

BY JEREMY TORR

When you buy a computer, you expect it to work when you switch it on. In fact, you expect it to work every time you switch it on. Forever. But as we all know, sooner or later it just won't. It will break down.

The big question then is how to get it mended. Do you open the case and try to fix it yourself, do you take it back to the shop you bought it from, or do you simply get out the warranty agreement you signed when you bought the machine? If you are the prudent reader we take you for, it will be the latter.

CONSUMER FOCUS

the customer opts to show loyalty with their wallet.

Companies such as Hewlett-Packard, Osborne and Packard Bell all use their own service agents, and provide a complete OSW (Onsite Service Warranty) as part of the purchase price. All offer extended warranty plans which give up to five years' cover to any purchaser of a new machine.

In the region of the no-name clones, however, things often become a little more cloudy. Although virtually every PC sold will have some kind of warranty, the difference between two apparently similar, same-length agreements can be quite considerable.

In many cases, the assembler of the system will offer a guarantee based on the warranties provided by the component manufacturers. Although this has advantages in some areas — often hard disks come with a five-year replacement warranty — it does mean that different parts of the PC may have different warranty periods. And it often also means the user has to wait while the assembler chases the individual supplier for a warranty claim, check and possible replacement.

The options for warranties on computer equipment are usually fairly straightforward. You can opt for the standard manufacturer's warranty, a third-party maintenance contract, or an optional extended manufacturers' warranty.

The first and simplest option is to go for the warranty that comes with the machine itself. This can range from a one year labour-only warranty through to a comprehensive five year labour warranty with proportional parts cost built-in. In many cases, buyers will simply opt for the maker's warranty and have no problem at all with that. This applies especially to the major brands where a problem will be dealt with by the manufacturing company; the user need have no contact with any other company. Extended warranties also fall into this category and sometimes include buy-back or upgrade clauses if

The variations

Warranty providers such as Fujitsu and CompuAid all offer a variation of services to the PC owner looking for some security. The most popular from both provider and consumer view seems to be the onsite service warranty (OSW) service. This provides for a service engineer to come to your home or office within a specified time. Once there, the engineer will make sure your machine is running again before leaving. Usually, all costs including labour, parts and transport are included.

The second most likely option is the return to base (RTB) service. For users who have plenty of spare capacity, less money to spend or are very close to a warranty service centre, this is most suitable. The customer returns the faulty machine to the service centre which will fix everything up, but usually

within days rather than hours. Collection is usually also up to the owner, but again all parts and labour are generally included.

Some medium-sized operators with good in-house expertise may want to consider time & materials (T&M) warranty cover. This is usually best for those sites which can fix most things themselves, but may want to call in an expert occasionally for major problems.

Lastly, if you are extremely paranoid about failure or have mission critical applications running, you can opt for onsite cover, although this is really only applicable to major corporations. This means a permanent engineer will be available for work on your site at any time, with all facilities and materials thrown in.

The players

Australia Wide Warranties (03 593 2244). Specialist warranty provider. Direct via retailers and manufacturers. Supply service for Harvey Norman, RetraVision. Full OSW service provision, networking prices on application. \$300 for 3 years.

Bull HN Information Systems (02 847 7100). Supply service for Kyocera, Epson, Altos, Sequent, IBM. Mainly targeted at the corporate sector. Prices subject to negotiation. Single unit service currently being discontinued. OSW service.

CompuAid (1800 622 394). Specialist warranty provider. Supply service for Brashers. Also sell to individuals. Full OSW, extended warranty on top of maker's first year. Second year \$100, second and third year \$199. Hotline access.

Fujitsu Bell Atlantic (02 887 9333). One of the biggest. Supply service for Compaq, AST, Acer, Dick Smith. Two to three year contracts preferred, around \$200/year for small installations OSW. Can cope with single machines. RTB option.

MicroArts (03 696 5955). OSW, on call, phone hotline. \$200 for 3 years basic. Small 5 to 10 user networks price on application

Osborne (02 844 8448). \$200 Gold Club membership fee gives five years' access to hotline and field service. Field technician service (\$45 per visit plus component costs) on any third party products bought through them.

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Remember, no component maker is in business to give products away; they will want to see the faulty item, check it and approve the repair before sending the details back to the assembler who will then inform you of progress before doing anything. In the process, weeks can slip by with still no working PC on your desk. Especially if the component has to be sent overseas for repair or warranty claim checking.

As an insurance against this kind of open-ended scenario, many users and especially small businesses choose to pay for a third-party warranty service. This usually costs a set fee per year, is independent of PC make to a large degree, and offers a guaranteed service (either parts and labour, or a proportion of both). The service is also usually delivered with a fixed response time. The enormous advantage here is that the service, whether it is onsite or return to base (RTB), is based around getting the machine running again, not on proving a warranty claim is valid.

So when repairers come calling, they will not leave until your machine is returned to good health. In some cases this may mean replacing the motherboard, hard disk, feature card or similar. But it will usually be done then and there rather than taking everything away for analysis over an indeterminate period of time.

What to look for

If you are buying a PC from any supplier, ask what kind of warranty is available. In our straw poll survey, an astounding number of retail outlets either didn't know basic details, or gave incorrect information about the kind and length of warranty on offer. Always ask for a copy of the warranty application form, and the contract that goes with it. If there is any confusion, do not hesitate to ask for the number of the service provider to

find out exactly what you will be getting. Spending a few hundred dollars extra only to find out you have to ship your faulty unit back to Canberra for servicing is less than useful.

The other aspect of many warranties is — as always — the small print. Many include exclusions such as monitors, mice and keyboards, or these may have limited length warranties of their own. Many have no-tamper exclusions, so any attempt by you to fix the problem can result in the payment of the full service expenses even though you are still in the warranty period.

Especially relevant to Australian users is the distance limitation. Many warranties offer what at first look seems brilliant service, but then add a 'within 70km of a metro zone' or some similar exclusion. This can severely impact on rural users, so if you are outside the major centres check there is some provision for this scenario. Don't just trust to luck or the goodwill of the maintenance company or, again, you could be facing a hefty time/transport bill.

Some companies (such as Osborne) offer extended warranties on equipment other than their own. This is usually restricted to the equipment which has been fitted by the warranty provider, however, so don't expect them to service your whole machine if you only bought a new graphics card from them. If your warranty provider only supplies labour, be prepared to pay at least the going rate for spare parts as many manufacturers charge third party warranty companies top dollar for components, rather than trade prices.

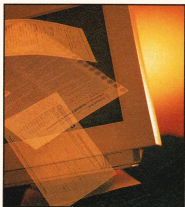
Check availability times. If your home PC dies and the onsite engineer can only look at it during normal work hours, you will have wasted the onsite provision unless you take time off work. Extended service before 8.30am or after 6pm is especially important to home users. Most warranty companies also run an associated phone problem line to help sort out simple problems over the phone without the need of a call out. If the warranty you choose does not have that facility, you could be wasting time and transport on simple setup errors or easily rectifiable problems.

Cautionary story

Having a warranty is only half the story. Having the use of a machine is the other. Even if your machine is in the computer labs being fixed, it is not much consolation if your business is grinding to a halt. One recent buyer from a large computer super store had the misfortune to be supplied with a dud machine. No problem, it was under warranty, so he took it back. No problem again, it was exchanged immediately and put into service. The only trouble was, it was not quite the same machine (although our victim did not realise this.) The mouse drivers, memory size, operating system and sound card settings were all different. So most of the previously used software did not behave in the same way. Back to the shop (some five days and six trips later), to take the second machine back, and to check if the problem was hardware or software. The staff were fully apologetic, and supplied the original machine back again as it had miraculously come back to life. This time, all the previous drivers and setting corresponded to the software the user wanted to run, and all was efficiency. The only problem was, the user had spent large reserves of time, transport, cash and energy sorting out a problem that should never have happened in the first place.

Moral: Make sure the system works before you take it home, or demand onsite service until the system works.

If you are purchasing a relatively new machine second hand, ensure the warranty is transferable. Some require you buy an extension to the original, or even void the original. Also check if the warranty is valid overseas — especially if you have a notebook. IBM and Compaq are both good with RTB service in this respect, but some clones might have less useful service provision in other countries.▲



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Mag BMC15FX15" 1024x768 N1A 499
Mag DX15F 15" 1280 N1A Gm 871
Mag MX15F 15" 1280x1024 N1A 835
Mag M17F17" 1280 N1A Gm 1463
Mag M17F17" 1600x1280 N1A 1,725
Mag MX21F 21" 1600x1280 N1A 4,250

Sony

Sony 1700 .25 17" 1024x768 N1A 1,079
Sony 205E1 20" 1600x1280 N1A 4,995

Viewsonic

VS 6e 14" 1024x768 N1 486
VS-15e 15" 1280x1024 N1A 1,680
VS-17G 17" 1280x1024 N1A 2,123
VS-17 17" 1600x1280 N1A 2,123
VS-20 20" 1600x1280 N1A 3,163
VS-21 21" 1600x1280 N1A 3,797

Configure Your Own System

Instead of having a

MAG 15" MONITOR (\$671)

in this system, you might prefer, let's say, a

VIEWSONIC 15 (\$1680)

Simply replace \$671 with \$1680 and add up the right column again. \$5,683 in this example.

You can therefore price your own configuration by referencing Base Systems, Monitors and Cables etc.

Most prices New on this page!

GRAPHICS CARDS

ATI GRAPHICS CARDS

Grphs Xpression 2m 2ram 64B/Vesa 477
Viper Se Vram 2M PCI CD 778
Grphs Turbo Pro Turbo 2M Vram/Vesa 477
Grphs Xpression 2m 2ram 64B PCI CD 778
Grphs Turbo Pro 2m 2ram 64B PCI CD 778
HERCULES GRAPHICS CARDS
Hercules Stingray 1M 1Dram PCI 199
Hercules Dynamix 32M 2Dram PCI 438
Hercules Dynamix 32M 2Dram Vesa 438

DIAMOND GRAPHICS CARDS

FREE Core! Draw Ver 3 CD-Rom with some Diamond cards see CD below
Viper Se Vram 2m/Vesa CD 719
Stealth 64 Vram/Vesa CD 448
#9 GXE64 1M 1Dram PCI 352
Viper Pro Vram 2m/Vesa CD 880
Speedstar 64 Card 1mb PCI 341
Speedstar 64 Card 2mb PCI 433

DIAMOND CONT...

Viper Pro Vram 2M PCI CD 880
Viper Se Vram 2M PCI CD 778
Viper Se Vram 4M PCI CD 985
Stealth 64 2m 0Dram PCI CD 448
Stealth 64 2m, Vram PCI 673
Stealth 64 4mb, Vram PCI 937
#9 - 64B/C18 VESA
World leaders for CAD and DTP high performance graphics...
#9GXE64 1M 1Dram Vesa 376
#9GXE64 2M 1Dram Vesa 495
#9GXE64-Pro 2M Vram Vesa 757
#9GXE64 1M 1Dram PCI 352
#9GXE64 2M 1Dram PCI 487
#9GXE64-Pro 2M Vram PCI 784

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NoteBook Computers



TOSHIBA 5-Star Dealer



\$2,290

T-1910 486SX33
Monochrome LCD
4 Mb Ram, 120 H.D.



\$2,790

T-1910 486SX33
Monochrome LCD
4 Mb Ram, 200 H.D.



\$3,250

T-1910 486SX33
Passive Colour.
4 Mb Ram, 120 H.D.



\$3,330

T-1910 486SX33
Passive Colour.
4 Mb Ram, 200 H.D.

Monochrome T-1910's feature a sideli Transflexible screen for high contrast and resolution. The colour models feature Passive STN, 256 colour at 640 x 480 resolution. All of the T-1910's include Dos 6.0, Windows and a trackball mouse. Other features: Ram is expandable to 20Mb. External Ports - VGA, PS/2 Mouse port, serial RS-232, Parallel/external FDD port. 1 x PCMCIA type I - iii slot. Weight 3.9Kg. 12 months international parts and labour warranty.



\$4,750

T-2400 486DX2/50
Passive Colour.
4 Mb Ram, 250 H.D.



\$4,950

T-2400 486DX2/50
Passive Colour.
4 Mb Ram, 320H.D.



\$6,190

T-2400 486DX2/50
Active Colour.
8 Mb Ram, 250 H.D.



\$6,350

T-2400 486DX2/50
Active Colour.
8 Mb Ram, 320 H.D.

NoteBook featuring SL Enhanced Intel 486DX Processor. (3.3 volt) Passive colour RAM expandable to 20Mb. Active expandable to 24Mb. Vesa graphics adaptor, 1 PCMCIA Type II & 1 x type III, built in speaker and microphone. Lightweight, removable Nickel Metal Hydride battery, avg life 2+ hours. Average charge time 2.3 hours. 3.2 Kgs with battery. 12 Months International Parts and Labour warranty.



\$3,950

T-3400 486SX33
Monochrome LCD
4 Mb Ram, 120 H.D.



\$4,698

T-3400 486SX33
Active TFT Colour.
4 Mb Ram, 250 H.D.



\$6,490

T-3600 486DX2/50
Active TFT Colour.
8 Mb Ram, 250 H.D.

Highly portable T-3400 Sub-NoteBooks weigh in at a fractional 2.25 Kg (5 - 6 lbs) but offer 486SX33 power, 30% smaller than an A4 NoteBook, 1 PCMCIA Type II slot, pre-installed DOS 6.0 and Windows 3.1. Occupant pointing device, removable Lithium Ion Battery 3.6Vr, Power on Password. RAM options 4, 8 or 16Mb.

As for the T-3400 with 8Mb Ram, Expandable to 24Mb Ram, 1Mb Video Ram. Weight 2.2 Kg.



\$7,550

T-4700 486DX2/50
Active TFT Colour.
8 Mb Ram, 320 H.D.



\$9,150

T-4800 486DX475
Active TFT Colour.
8 Mb Ram, 500 H.D.



\$11,490

T-4900 Pent.75
Active TFT Colour.
8 Mb Ram, 810 H.D.

60486 DX2-50 The T-4700, Dos 6.0, Windows 3.1, Win Sound System, In-built stereo speaker, slip-cover, Direct-Connect Backpack Mouse. Ram exp to 24Mb. Active TFT Colour screen. 2 x PCMCIA type I (1 x type II) 2 - 3 hour NiMH battery. 3 yr int'l warranty.

BLOW THEM AWAY
• PENTIUM NOTEBOOK
• 810MB HARD DISK
• MULTIMEDIA
• 2 X PCMCIA

ZENITH



\$4,756

NoteFlex 486-SX33
Monochrome LCD.
4 Mb Ram, 200 H.D.



\$5,777

NoteFlex 486 DX2/50
Passive Colour.
4 Mb Ram, 200 H.D.



\$7,850

NoteFlex 486 DX2/50
Active Colour.
4 Mb Ram, 340H.D.



\$9,990

NoteFlex 486 DX4/75
Active Colour.
8 Mb Ram, 520H.D.

Zenith Z-NOTEFLEX is available in 486 - SX33 mono, DX2/50 Passive & Active, and DX4/75 Active TFT colour. Ram expandable to 24Mb. Built in 16 bit Stereo Audio. 2 x PCMCIA type II & 1 x type III slots. The Z-Noteflex offers amazing modularity. All major components are easily removable and upgradeable—by the user. In fact, **THIRTY SEVEN CONFIGURATIONS** are possible, please call for details.

>> **FREE 3 YEAR ACCIDENTAL DAMAGE WARRANTY!** <<



\$2,590

Z-Lite 486 SL25
Monochrome LCD.
4 Mb Ram, 170 H.D.



\$3,750

Z-Lite 486 SL33
Passive Colour.
4 Mb Ram, 200 H.D.



\$3,990

Z-Lite 486 SL33
Passive Colour.
4 Mb Ram, 200 H.D.

Intel 486SL-25MHz Low power CPU, 8.5" backlit VGA Mono screen. Or Intel 486SL-33MHz Passive Colour with J-Mouse, 8K Internal cache. Ram exp to 20Mb, 2 x PCMCIA type II slots. 3 hour NiMH battery. Includes Dos 6.0, Windows 3.1, Lipept trackball.



\$3,750

T-1960 486DX2/50
Passive Colour.
4 Mb Ram, 200 H.D.



\$3,390

Z-STAR EX 486 DX2/50
Monochrome LCD.
4 Mb Ram, 200Mb H.D.



\$4,990

Z-STAR EX 486 DX2/50
Passive Colour.
8 Mb Ram, 340H.D.



\$6,859

Z-STAR EX 486 DX2/50
Active Colour.
8 Mb Ram, 340H.D.



\$4,940

T-1960 486DX2/50
Active TFT Colour.
4 Mb Ram, 200 H.D.



\$3,390

Z-STAR EX 486 DX2/50
Monochrome LCD.
4 Mb Ram, 200Mb H.D.



\$4,990

Z-STAR EX 486 DX2/50
Passive Colour.
8 Mb Ram, 340H.D.



\$6,859

Z-STAR EX 486 DX2/50
Active Colour.
8 Mb Ram, 340H.D.

CANON



\$6,329

BN-120 486 DX-2/50
Passive Colour.
4 Mb Ram, 260Mb H.D.



\$6,280

BN-120 486SL2/50
Passive Colour.
4 Mb Ram, 340 H.D.



\$6,998

BN-120 486 DX-4/75
Passive Colour.
4 Mb Ram, 340Mb H.D.



\$6,998

BN-120 486 DX-4/75
Passive Colour.
4 Mb Ram, 340Mb H.D.

The latest offering from CANON Technology. The BN-32 & 120 series combine a colour screen notebook with a **BUBBLEJET BUILT-IN!** The BN-32 or 120 includes Dos 6.0 & Windows 3.1, 2 x PCMCIA slots, Ram expandable to 12Mb.

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including fast drying, rich black at
360x360dpi.

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Canon Monochrome	Canon Ink
BJ-105X 110cps 80 col 333	Black Ink for BJC-600 22
AutoSheet Feeder, B1020 89	Each Colour Ink for BJC-600 31
BJ220, 248cps, 80 column 450	Black Ink for BJC-800 51
BJ230, 248cps, A3 632	Each Colour Ink for BJC-800 75
BJ300, 300cps, 10" 360x360 999	Ink Cartridge for BJ-1020 46
BJ330, 300cps, 15" 360x360 1159	Ink Cartridge for BJ-200/230 46
1st bin sheet feeder / BJ300 164	Ink Cartridge for BJ-300/330 33
2nd bin sheet feeder / BJ300 94	
1st bin sheet feeder / BJ300 214	
2nd bin sheet feeder / BJ300 146	

Canon Colour
BJC-600 Colour BubbleJet 1075
BJC-800 Colour BubbleJet 2490

All Printers Include
Free Cable

HEWLETT PACKARD

HP InkJets	Each Colour Ink for XL-300 43
HP DeskJet Port. w. S/W Fdr 435	Hewlett Packard Lasers
HP DeskJet 540 B&W 565	HP-4L, 300dpi, 1Mb, 4ppm 1165
	HP-4P 600dpi, 2mb, 4ppm 1625
	HP-4M 600dpi, 2mb, 12ppm 2890
	HP-4SI 600dpi, 17ppm, 2mb 5828
	HP-4SI 600dpi, 4mb, P/S 1770
	HP-4MP 600dpi, 4ppm P/S 2049
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HP DeskJet 12000 colour 2690	HP-4MV, 9ppm, 12mb, P/S 5138
HP DJ 1200C col P/S 3748	HP Laser Options
	Toner cartridge for HP-4 219
	Toner cartridge for HP-4L 128
	Toner cartridge for HP-4V 468
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	U.S. Letter size tray for HP-4 163
	A4 size paper tray for HP-4 165
	1Mb Ram for HP-4L 166
	P/S Inkjet Upgrade for HP-4 613
	1200dpi P/S upgr for HP-4 2445
	HP Jet-Direct ethernet 107 641
	HP Jet-Direct ethernet 107to360 693
	HP Jet-Direct Token ring 999

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XL-300, Pcl-5 & AppleLink 6848	
XL-300, Postscript 3246	
Postscript Upgr. for XL-300 240	
A3 Tray Option for XL-300 240	
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Hi Capacity Black Ink for DJ 48	
Black Ink for 1200C 64	
Each Colour Ink for 1200C 53	
Black Ink for XL-300 35	

FUJITSU

Fujitsu 24-Pin	Inkjet & Laser
DL1150M, 110 Col, 180 354	Breeze 100 Plus Inkjet 375
DL1150C, 110 Col, 240 369	Print Partner 4000 PCL51070
DL1150CS, Ser 110 Col, 240 352	The Print Partner 4000 has
DL1150SM, 110 Col, 180 687	a 100 sheet cassette and
DL1250MS, Ser 110 Col, 180 696	manual feed, Postscript
DL3800, 136 Col, 330 639	optional.
DL6400M, 136 Col, 504 2187	

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Wintype
4000

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LC-240, 20 p 10" 240 Cps 420	Chp - Single 37
LC-24-100, 24 p 10" 240/90 399	20 Chp Film Sheets 38
	Ribbon Filtron-on Sheet 29
	Iron-on Sheet Film - A4 11
	Strip Labels 643
9 p 10" 200/67 Cps 358	Various S. Each: 35
9 p 10" 420/84 Cps 875	Docket Printers
9 p 10" 420/84 Cps 988	08340s 40110cps Serial 394
24 p 10" 240 Cps 496	09340 40110cps Par. 394
24 p 10" 222/67 Cps 594	
24 p 10" 375/125 Cps 1,040	
24 p 10" 375/125 Cps 1,156	
Heat Fusion	
S144 Printer 1,120	40175cps Parallel 643
Black Ribbon - 3 / K 68	40175cps Par. A.P.C. 861
	42160 Serial 419
	42160 Parallel 419
	Paper Rolls F/D8340i 25/Pk 119
	2-ply Paper Rolls F/D8340i 190
	Lasers
	Wintype 4000 GDI 999
	LS-5H 5ppm, 2mb, 2 Bin P/S1,699



EPSON

HP InkJets	Each Colour Ink for XL-300 43	Epson 9-Pin	Epson 24-Pin
HP DeskJet Port. w. S/W Fdr 435	Hewlett Packard Lasers	UX-100, 80 column 299	LQ-100, 80 col, 200CPS 279
HP DeskJet 540 B&W 565	HP-4L, 300dpi, 1Mb, 4ppm 1165	LX-300, 80 col, 180cps 249	LQ-570+, 80 col, 192CPS 626
	HP-4P 600dpi, 2mb, 4ppm 1625	FX-870, 80 col, 290 cps 818	LQ-860+, 80 col, 330CPS 943
	HP-4M 600dpi, 2mb, 12ppm 2890	FX-1170, 136 col, 290 cps 981	LQ-870, 80 col, 330CPS 982
	HP-4SI 600dpi, 17ppm, 2mb 5828	Epson High Speed	LQ-1050+, 136 col, 295CPS 1217
	HP-4SI 600dpi, 4mb, P/S 1770	DFK-5000, 136 col, 533cps 3599	LQ-1070+, 136 col, 252CPS 863
	HP-4MP 600dpi, 4ppm P/S 2049	DFK-8000, 136 col, 1066cps \$170	LQ-1170, 136 col, 330CPS 1249
	HP-4M+ 6Mb, 12ppm 3699		LQ-2550, 136 col, 400CPS 1792
	HP-4SIMX 600dpi, 17ppm 8499		EPSON COLOUR STYLUS
Colour Option for HP 540 82	HP-A3 Lasers		On 720 DPI. Good quality colour
HP DeskJet 5600 colour 951	HP-4V, 9ppm, 4mb 3890		standard bond 'copy' paper,
HP DeskJet 12000 colour 2690	HP-4MV, 9ppm, 12mb, P/S 5138		however exceptional results are
HP DJ 1200C col P/S 3748	HP Laser Options		obtained using special coated
	Toner cartridge for HP-4 219		paper.
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	Toner cartridge for HP-4V 468		
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	A4 size paper tray for HP-4 165		
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	P/S Inkjet Upgrade for HP-4 613		
	1200dpi P/S upgr for HP-4 2445		
	HP Jet-Direct ethernet 107 641		
	HP Jet-Direct ethernet 107to360 693		
	HP Jet-Direct Token ring 999		



HP PaintJet	4754
XL-300, Pcl-5 & AppleLink 6848	
XL-300, Postscript 3246	
Postscript Upgr. for XL-300 240	
A3 Tray Option for XL-300 240	
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Each Colour Ink for 1200C 53	
Black Ink for XL-300 35	

XEROX COLOUR LASER

Xerox XP 4900 Colour \$14,550

3ppm Full colour A4 Laser Printer.
Fastest Colour/Mono laser at this resolution. • 12ppm Mono or 3ppm Colour output. • Full Pantone matching system • 25MB/s Risc Processor, Adobe Postscript™-Level 2. (Also supports for Apple ColourSync, 'Ei/Color' matching system.) • 1200 x 300dpi, 8mb ram standard expandable to 48mb • 15,000 print duty cycle • Four separate CMYK cartridges • Standard Interfaces: Centronics, Local Talk and RS-232 Serial, Ethernet optional. • Standard OnSite Warranty.

XEROX High quality Mono Lasers	AP5 A4 600dpi 5ppm 3,790
	AP8 A4 600dpi 6ppm 3,790
	AP10 A4 600dpi 10ppm 3,100
	AP13 A4 600dpi 13ppm 6,183
	AP20 A3 600dpi 20ppm 5,784
	The Xerox AP20 has 26 resident PCL5 fonts while the other lasers each have 46 fonts resident.
	12 months warranty for all with options for extended on-site.

AP-5 \$1,850

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S/B Digital Edge 3 spin \$1,199

Sound blaster 16 Sesi 2 card, Triple speed NEC CD-Rom drive, Speakers, Mike, Voice assist S/W, textAssist S/W, Creative S/W on floppy. Titles include- Aldus Photostyler SE, Kai's power tools, Groliers Encyclopedia, Action and Star, Creative Clips, Composer, Speed, Rebel Assault, Digital Morph.

NEW 4-spin kit \$1,225

Super Special \$652

Media Vision MV-3000 \$679

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Video capture card allows display of full motion digital video in a movable, sizable window. Capture, freeze, store, manipulate and export images from VCRs' Videocass, cameras and broadcast video. Video control of hue, saturation, brightness, contrast and RGB. Bundled software: Video Kit S.E., Photostyler Special Edition, JPEG compression.

Super Special \$855

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Video capture card for live and still video. Includes the ability to create graphics overlay, compressed moving sequences, display video in a scalable Window. This is the professional edition with enhanced software features.

Super Special \$465

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Z-Player \$999

Double Spin CD-ROM drive, Integrated 16 bit sound & stereo speakers, head phone jack Audio in/out, 300Kb/s transfer rate, 320ms seek time. Optional Ni-Cad battery pack, also operates off 6xAA battery set. Equipped with AC/DC power supply. Supports Audio Playback without connecting to a PC. Suitable for any PC with Type II PCMCIA standards.

Super Special \$579

CD16 GameBlaster Pak \$629

Kit includes Creative double speed drive model 563, SoundBlaster 16 sound card, Creative software on floppy disk, speakers and joystick. Titles are: Return to Zork, Rebel assault, Iron Helix, Sim city 2000. 



NEC CDR90 4 Spin \$1,499

External Quad Spin SCSI CD-ROM designed for applications that require high performance transfer also for smoother & larger animation and video. Ideal for use in Multi-User & Network environments that require faster data retrieval. 180ms access time & 600-Kb/s transfer rate, 256K cache, Multisession & Photo CD-Compatible. Front LCD panel, head phone connection and volume control. Complete with CD Caddy. Requires CDAT160 controller (\$228) for Quadriple Spin Drive.

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NE-2000 Ether Adap (5 Pk) Combo	1618
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Xircum Pock Ether Adap RH45 10baseT	515
Xircum Pock Ether Adap, Thin Coax/Up	518
Xircum Pock Ether Adap, Thick Aut	518
Xircum Pock Ethernet Print Server + Up/Coax	843
Xircum Port Mux P Pock Adap	198
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Xircum Netware Access Point	686
D-link De-620 Ethernet Pock Adapter Coax	293
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D-link De-620 Ethernet Pock Adapter 10t	325
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Cable Assy, Coax 5 Mtr, Rg-58 F N/wk	39
Cable Assy, Coax 10 Mtr, Rg-58 F N/wk	55
Cable Assy, Coax 15 Mtr, Rg-58 F N/wk	66
Cable Assy, Coax 20 Mtr, Rg-58 F N/wk	89
Cable Assy, Coax 25 Mtr, Rg-58 F N/wk	90
Cable Assy, Coax 30 Mtr, Rg-58 F N/wk	99
Cable Assy, Coax 50 Mtr, Rg-58 F N/wk	146
Cable Assy, Rg-58 Loop Cable F N/wk	30
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Rg-58 Elnet Cable, 100 Mtr Roll Beldco	300
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Bnc Extension Adap F/F	15
Wall Plate F Ethernet Coax Cable	15
Connector F Ethernet Wall Plate	15

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Cable Assy, 10T Cat-5, Tw Pair, 10m	293
Cable Assy, 10T Cat-5, Tw Pair, 15m	325
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Cable Assy, 10T Cat-5, Tw Pair, 25m	170

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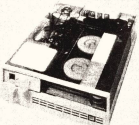
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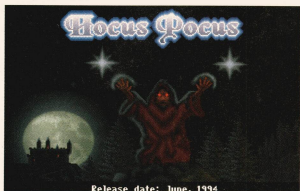
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HOCUS POCUS

VGA action from Apogee



Release date: June, 1994

Terexin, leader of the Council of Wizards, is sending the young sorcerer, Hocus, on a special mission to prove his worthiness. This mission will take Hocus to 16 unique realms, each filled with unique dangers and enemies. Few have survived the Terexin's final test—for many it's a one-way trip.

Along the way Hocus will encounter dragons, imps, ghosts and 30 more unique creatures, demons and enemies. Survive, and Hocus becomes a full-fledged, card carrying Wizard. The other option is not so favourable.

Awesome and beautiful 256-color VGA graphics. After every two levels of play the level graphics, background and enemies completely change, giving this game unparalleled variety. Hocus Pocus is a action platform game, with exciting puzzles built into each level's structure.

Hocus is armed with a standard magic spell (he's not yet a full Wizard, after all), but he can find several potions that give him a temporary boost of magical energy. There are potions that give Hocus the ability to shoot rapidly, jump higher, teleport and fire a devastating energy blast, among others.

FEATURES

- * Smooth 360 degree scrolling, with a parallax background.
- * Over SIX MEGS of 256-color VGA animated graphics.
- * Four episodes with 36 huge levels!
- * Over 30 different monsters, plus four huge bosses!
- * Incredible new Apogee sound engine, with a dozen theme songs during play. - multi-channel sound effects, with up to 8 effects playing at once! - supports all major sound cards including: Gravis UltraSound, SoundBlaster/Pro/16, Pro Audio Spectrum 16, AdLib, Wave Blaster, Sound Man 16, Disney Sound Source, Tandy Sound Source, Sound Canvas, and General Midi. - individual control of music and sound effects volume.
- * Save/restore options, selectable skill levels, four cheat passwords!
- * Supports keyboard play & joysticks. The game also works with your Gravis Gamepad!

Requires 386SX or better, 567K (580,000 bytes) free RAM, VGA graphics and 10 MB hard disk space.



All four episodes of Hocus Pocus are available in Australia from BUDGETWARE for only \$49 with FREE shipping and handling.

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Apogee's latest smash hit game

RAPTOR



No, this isn't a dinosaur game! It's the most action-crazed, guns blazing, shoot 'em up game you've ever played! Your PC will never recover.

Full 256-color VGA graphics explode onto the screen with an opening cinematic that'll wake up your neighbors. You can pick to play one of four mercenary pilots, two males and two females, representing different backgrounds. Enter the weapons store with your hard earned cash and equip your futuristic fighter with the hottest weapons technology the future has to offer—over 11 to choose from!

Discover secrets, find the bonuses, and battle the boss ships that appear at the end of EVERY WAVE! With each ship and ground target you destroy, you'll earn more cash to increase your ship's technology for the next wave. You'll be driven to kill and destroy—but then, it's in your blood anyway.

The Raptor—a bird of prey—is an awesome warship. And you've been chosen to pilot it into enemy territory to kill or be killed.

Incredibly smooth VGA graphics and animation are only half the story. The mood-setting, heart-pounding music in Raptor will leave you breathless, especially if you have a higher end sound card like the Roland or Wave Blaster. (That's right, Raptor supports the General Midi music format, which provides very high quality music for PC games.) All other major sound cards are also supported!

RAPTOR requires a 386 or greater processor with a minimum of 2MB of RAM and 12 MB free hard disk space.

Supports joystick, mouse and keyboard.



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BLAKE STONE

Apogee's latest 3D Adventure



Many people have asked how Apogee will follow the huge success of Wolfenstein 3D which took the gaming world by storm in 1992. Now the answer is here! **BLAKE STONE**, their latest 3D Virtual reality adventure game rockets you into the future where a sinister madman, using genetics to create an army of bizarre mutants, is waging a war against the universe.

BLAKE STONE takes you beyond anything seen in computer games before. Full of action packed graphics, this game will keep you playing for days on end. If you liked Wolfenstein, then you will love **BLAKE STONE**.

In this futuristic game you play the part of British agent Blake Stone. The story pits you against Dr Goldstern, the evil mad scientist. In the six action packed episodes that come with the complete version of the program you can explore 60 levels of maze like domains seeking to find the evil Dr Goldstern and stop him before he takes over the universe. Along the way you will meet a host of adversaries ranging from meek and mild scientists to evil bio-robots with amazing strength and intelligence.

New game design features found in **BLAKE STONE** include:

- * Re-entrable levels which add a new dimension to the game play.

- * Smart Actor Characters who can actually "think" about the situation they find themselves in and act accordingly.

- * Interactive Objects such as specific wall sections which are designed to interact with the player, a feature not seen in any other game.

- * Concession Machines which are used to get food, drinks, or a clue to help you on your way.

- * Computer Terminals which when activated give you access to Goldstern's computer information network. This network is able to control certain elements of the game, for instance disabling ceiling mounted turrets, as well as allow you to view other areas of the game.

- * Plasma Barriers which are controlled by switches located throughout each complex.

BLAKE STONE requires VGA graphics, a 386SX or greater processor, 640K RAM and 6 MB of free space on your hard drive.

* Enhanced Actor Animations including mutants that rise from gurneys for their ensuing chase, Liquid Aliens that flow toward you, then rise to attack, Electro Aliens which emerge from wall mounted sockets, and many more!

Other cool stuff added to make this game exciting, fun, and just plain different include crates that can be blown apart to reveal weapons and other goodies, one way doors, Direct Level Transports that warp you to secret levels, lots of goodies like gold, money bags, food, and ammo to collect, over 16 unique actors such as guards, scientists, mutants, and pods, and five futuristic weapons ranging from single shot hand guns to powerful laser weapons. **BLAKE STONE** also features a great Sound Blaster sound track to add to the enjoyment.

The complete six episode set of **BLAKE STONE** is available for \$79 with FREE shipping and handling, and a FREE bonus game. To order call

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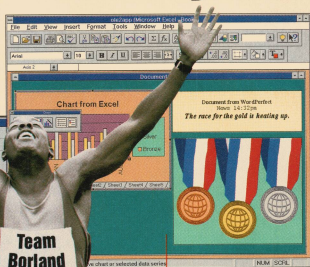
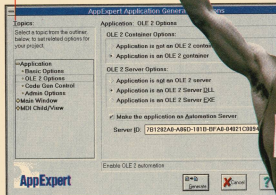
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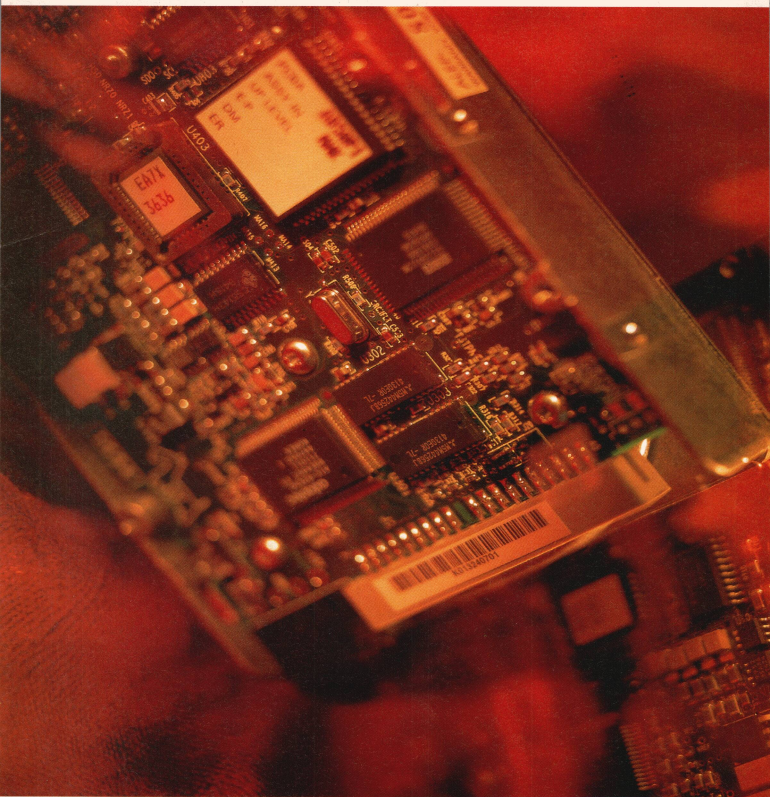
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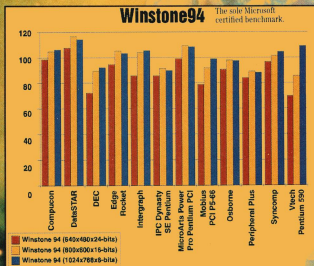
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From page 224

causing a fire to suddenly appear, crackling, all around you. A second later there's a detonation that usually wipes you out in one go. Then there's the question of layout. I get the impression that Mount Erebus, one of the toughest of the old DOOM levels, was a favourite with the game's designers, because many of the last 20 levels are played outside under the sky (with the battered skyscrapers of the city as a backdrop), and require one to run from building to building. This is true of Downtown, The Industrial Zone, The Tenements and particularly of the Suburbs. There are moats that have to be traversed by running into a teleporter in the acid. In level 18, The Courtyard and 19, The Citadel, the iD team has satiated its fondness for the castle-and-moat type layout. Both feature a single large building set in the middle of a giant lake of acid or

ber of traps and pitfalls. Some doors need to be shot to open, while others will only rise if another area, such as a picture or wall-hanging, is blasted. The most important skill you will need is jumping. Some levels can only be finished by making a seemingly impossible jump or, in the case of level 24, The Chasm, a series of eight impossible jumps! The Chasm features another of the new challenges, extra-thin walkways, in this case a network of them stretching for hundreds of feet. To either side a plunge to toxic death!

The journey through the annihilated city continues, although the familiar features of Earth are steadily suffused with the horrifying terrain of Hell and sometimes completely overwhelmed by it. Sometimes locations alternate. Level 25, Bloodfalls, takes place in the chambers of Hades itself, whereas the episode that follows it, The Abandoned Mines, sees a slight return to reality, although it's a reality infested with Commandos and Imps and ending with a manic Mancubus! The following level, Monster Condo, gives us a last glimpse of Earth's features before plunging into the

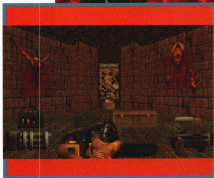
blackest pits. Starting from a vast wood-panelled central atrium, open to the sky, I had to blast my way through a series of nicely decorated rooms (including a delightful library that contains the worst series of traps in the game) before reaching the finale in the torture room (pushing past the hanging decomposed and eviscerated corpses) against two Arch-Viles. Next is the Spirit World, a maze of giant rock-hewn tunnels ending in a showdown between you and Mr and Mrs SpiderDemon (yes there's two of them!) and their 10 delightful Arachnotrons! The penultimate level, The Living End, is almost that. A near-impossible series of challenges based around a series of huge columns set on a lake of lava. Stairs cling to the side of each cliff face, and you must make your way slowly up, blasting away at the flying beasts and countless snipers.

Then it's through to the final level, Icon of Sin, dreadful in its simplicity, inexorably powerful in its intention of reducing you to screaming blood death. Opposite you is the gigantic face of the Devil himself. From the exposed brain visible at the centre of his forehead comes an endless stream of boxes, each one bearing a new monster. It could be anything from a lowly Former Human to an awful Arch-Vile. You must avoid these, activate the tower that will

Mr Spider Demon takes a fall on level 28: the Spirit World.



The ante chamber to Icon of Sin.



Finish the Icon of Sin and watch an animated walk-through of the DOOM II cast.

fire. A preliminary barbican has to be penetrated to gain access, then each room must be taken in turn. There are snipers and traps situated at all points, as well as secondary castles in other parts of the lake. Ending the castle-type levels is Gotcha!, which features a smaller encampment but an endgame featuring a Cyberdemon, Spiderdemon, Arch-Vile and Baron of Hell!

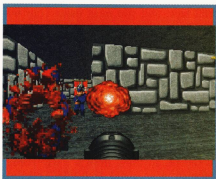
It's not just the armies of beasts that make the going tough, either. DOOM 2 has a touch more strategy than its predecessor. Rooms have to be taken in the right order. A switch may temporarily open a door in another location, and a quick dash is needed to reach it in time. There are plunging floors, dropping ceilings and any num-



raise you to the level of the Devil's face, and at exactly the right moment pump a rocket into the seething maelstrom visible inside his skull. To do it once, with an entire roomful of monsters concentrating on your total and utter demise, is the task of many lifetimes. You must do it three times. Pump the rockets into the fiend's boiling skull and he will explode, his death throes destroying the entirety of Hell itself! Only then will you have completed DOOM 2. Only then will you get to see the neat ending where the whole cast of characters is introduced one by one.

That's the end.

Or is it? Try looking around on level 15 in the battlements of the castle on the other side of the moat of fire and you'll find another teleport that will take you to the two secret levels, Wolfenstein and Grosse (if you can't find it, try typing IDCLEV31). They are replications of the first and ninth levels of the first Wolfenstein 3D story respectively, although in each case, there's something a little different. In Wolfenstein, expect hordes of incongruous demons and some neat secret doors. In the final room of this level find the secret panel to the super-secret level, Grosse. Instead of Hans Grosse (remember when a man with two



A werhmacht goes to pieces in the first secret level: Wolfenstein.

chainguns was scary?) though, you'll be facing a Cyber-Demon. In the final room here, ID's grim humour reaches a post-modern apex — around a central plinth are four hanging corpses; the bodies will be recognisable to some of you as being that of Commander Keen. He must be blasted away in order for you to return.

And that really is it, although it's great fun to go back with the cheats, which are the same as for DOOM 1 (although IDSPISPOPD, the walk-through-walls one, doesn't work, you must use IDCLIP to get this effect) and find all the secrets you missed the first time. DOOM 2 is even more playable than the first game and all the additions are terrific. I found myself using the combat shotgun most of all, and not only for its delicious clunking sound. The destructive power of this weapon is awesome. A few shots will clear an entire room full of former humans. A single blast can take out every kind of monster up to but not



The supersecret level, Grosse, sees the return of an old favourite.

including a Cacodemon, who requires the administration of a double dose. In fact, two in the face is the recommended dosage for unruly mutants. Unless, of course, it's a Pain Elemental you're facing, or an Arachnotron, in which case I advise that you to make that three blasts. Three blasts at point-blank range

will kill every beast up to and including the Hell Knight. Of course, angle and proximity are everything, as I found when I whacked three imps with one shot. Angle and proximity are also essential when jumping.

Overall DOOM 2 is more important to mankind than the invention of the wheel.

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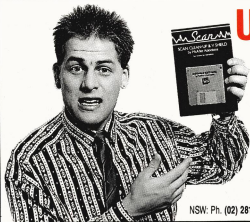
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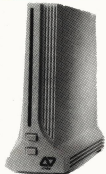
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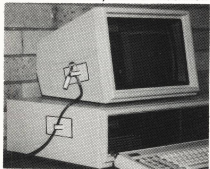
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APC DECEMBER 1994 PAGE 305

Readers' Choice Vote

Enter the running to win the Creative Office, our Editor's Choice-winning ultimate PC bundle, by voting for your favourite and most hated products of 1994.

To enter the competition and cast your vote, all you need to do is fill out this form and either fax it to (02) 267 4903, or mail it to APC Vote, PO Box 37, Sydney 2001. You can also email your vote to APC@ACPSydney.cmail.com.au

Entries close December 12, 1994.

To coincide with our annual Best of the Year awards, we'd like you to cast your vote for the best products or product families sold during 1994.

We haven't restricted the listings. The list below is comprised of a combination of our suggestions and Editor's Choice awards,



the best selling products of the year, and those products nominated by readers last issue.

Equally, if any of these products really cheesed you off, slash them with a big red cross.

If there are products you think we've left off our nominations list that should be there, please add them in.

1. PC desktop systems and notebooks

- a: Dell OmniPlex 566
- b: Power Macintosh

- c: Alpha Pentium 66
- d: Osborne MPower4
- e: HP Vectra 590c
- f: Toshiba T3400C
- g: Toshiba T1910
- h: DECpc XL590
- i: IBM ThinkPad 755C
- j: NEC Versa/S Slimline
- k: Other...

2. Application and development software

- a: Microsoft Office 4.0
- b: Lotus SmartSuite 3.0
- c: WordPerfect Office
- d: Harvard Graphics 4.0
- e: Works for OS/2
- f: Microsoft Visual C++
- g: Norton Desktop 3.0 for Windows
- h: Watcom Vx-REXX
- i: ClarisWorks 3.0 for Windows
- j: CorelDraw 5.0
- k: Other...

3. Operating environments and utilities

- a: Windows NT Workstation 3.5
- b: OS/2 Warp
- c: Lotus NoteSuite 3.2
- d: PC Tools for Windows 2.0
- e: Norton Utilities 8.0
- f: Windows for Workgroups 3.11
- g: Windows 95 Beta 2
- h: Quaterdeck SideBar
- i: Apple System 7.5
- j: Other

4. Peripherals and add-ons

- a: Canon Bubble Jet BJ-230/230
- b: Brother HL-630

- c: Sharp JX-9400H
- d: SoundBlaster Multimedia Office
- e: Media Vision Super Deluxe MV-3000 kit
- f: MGA Impression/MGA Ultima video cards
- g: Pioneer DRM-604X CD-ROM drive
- h: Sony CDU-33A CD-ROM drive
- i: Turtle Beach Multisound
- j: MS Windows Sound System 2.0
- k: Other...

5. Communications and networking

- a: Windows NT Server 3.5
- b: Lotus Notes 3.2 Server
- c: ccMail Mobile for Windows
- d: PowerLAN
- e: LANtastic 6.0
- f: Trio Datafax 4.01e
- g: Hayes Optima 14.4
- h: NetComm V.FAST
- i: HP LaserJet 4 Plus/4M Plus
- j: Compaq ProSignia
- k: Other...

6. Miscellaneous

- a: DOOM II
- b: Microsoft Home series
- c: Compaq Presario CDS 520
- d: World Wide Web
- e: Oz-Email
- f: CompuServe WinCIM
- g: Microsoft Keyboard
- h: Simpson's Screensaver
- i: Borland Sidekick
- j: Microsoft Multimedia Golf
- k: Other...

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CHIP CHAT

Recalcitrant sales staff, a digital solution for emotional dilemmas, heaps of Win95 dirt and, of course, a stunning missive from lunatic journalist HJ Simpson. It all adds up to a classic, pumping chip chat.

Customer feedback

A short scenario concerning an employee at the service counter of a well-known computer superstore using the initials HN (the store, not the employee).

Customer: "My computer that I just bought from you won't run Doom, and the person I bought it from said it would." Service person: "Yes, it is simply a matter of not having enough memory available." Customer: "But I had 16M of RAM fitted so I wouldn't have that problem! Isn't that enough?"

Service person: "The problem is that there isn't enough DOS memory available, not that the total RAM is too small. You will probably have to make a boot disk for Doom and run the game from that."

Customer: "That seems ridiculous. How is the average buyer supposed to know they need a boot disk, or even how on earth you would make one?"

Service person: "They don't, but they usually find out when they bring the (game or computer) back because it won't work."

Now that is what customer education is all about.

Communication breakdown/up

For busy computer freaks, having personal problems can be such a chore. Now a US-based company, Round Lake publishing, has come up with a solution to that tricky "Dear John/Jonna" letter scenario. It has produced a computerised (and highly tactful) letter writing program. It can deal quickly and digitally with such agonising problems as: "You didn't understand my needs"; "I'm Pregnant"; "Sorry I misunderstood your intentions"; and "I'm the child you gave up for adoption." It also includes that long time favourite; "I'm having an affair with your husband." All the socially wounded or sexually overactive correspondent needs to do is fill in the gaps in terms of sender and recipient, and all wounds should be healed in a trice, leaving the sender to get back to the serious business of running their computer.

Conspiracy theory I

Given the amount of publicly admitted delays to Windows 95, some industry commentators are wondering just where Microsoft stands with its commitment to the new GUI OS. Some are asking if it could be, given the slightly negative and highly unusual bias the media seems to be running with, that Microsoft is deliberately allowing a market backlash to be established against the product? Certain commentators have mused that this could all be a highly unusual way of making NT or Daytona look even better, or even of relaunching Windows 3.2 into a welcoming public frustrated by the lack of W95. One well-known US columnist asserts that given the amount of sway Microsoft holds over the media content, there must be some significance in the quantity of negative W95 press. Food for thought.

Whish you were there

Having spent squillions on its new Horizons disk-based dealer information package,

Hewlett-Packard triumphantly sent out the all-singing, all dancing, GUI-overloaded product locator and ordering package to all its dealers. The accompanying sheet said the new system was produced to help dealers keep in touch and up to date, and blew a few trumpets about it being better than any paper-based system ever was. It also advised dealers to load it immediately, and if they had any queries to call a certain HP representative. On calling this number, a pre-recorded message told callers the Horizons contact was on holiday for two weeks. Far Horizons indeed.

Conspiracy theory II

More dirt from under the W95 carpet. As Microsoft is demanding that all companies wanting to hitch a ride on the Windows95 gravy train submit full copies of all source code to the Gates corporate custodians, murmurs are being heard from would be add-on suppliers. With previous add-on software, such as Central Point Backup, Stacker and so on, Microsoft

has licensed the subset from the participating company. If Microsoft now — as reports from within the industry are indicating — demands full source code from all add-on suppliers, the company will instantly gain an enormous market advantage over all erstwhile competitors in virtually every avenue of the software business. Couple this with rumours of a back-down on W95, and it could be merely a massive information-gathering exercise.

Fright simulator

Tired of sitting on a chair while pretending to drive a Ferrari? The latest in simulation add-ons from McLaren (the people for whom Ayrton Senna used to drive) is what it somewhat courageously calls the Hyper Stimulator (Stimulator). These full-sized replicas sound like the very thing for every keen race sim player's den, as they come with fibreglass body shells, carbon fibre seats, real race tyres and a suede steering wheel cover. They can be fitted with any PC and the screen of your choice and will only set you back up to \$18,000. If nothing else, the price should hyper-stimulate a very active response.

You said it

The latest in hot high-tech equipment has been gathered together in a 32-page newsletter from Rod Irving Electronics. Called *Communicate*, it seems to have missed the point of its title. It was sent out addressed to "Business and Shoe Box Holders", printed in gloriously blurry black and white on slightly better than toilet paper stock, with an invitation to subscribe for only \$12 for a full year. If we were wanting to communicate, it would be to suggest *Communicate* reassess its budgetary objectives and aim slightly higher than the dunny seat.

The Gonzo Highway

I was down in Aspen, Colorado recently to visit my old friend and journalistic inspiration, Dr Hunter S Thompson. Seems now even he is jumping on the technology bandwagon, that overcrowded slow bus to hell some call the Information Highway. Hey, some even call it a Superhighway but so far the only super thing I have seen about it is the hype machine cranking it up. Oh, and the prices have looked super-steep too.

Anyway, Dr Thompson is well enough, though his physician has been ready to bury him more than once in recent years. He's kicked off the drug habits and replaced them with a new form of electronic tripping: Cyberspace. He has always been a very innovative man, cutting at the living edge of society, finding the real freaks and observing them with a detached professional keenness rarely matched except by Gallic sporting officials.

"Let me tell you this, [H J*]," he confided to me after about the 14th modern connection of the evening. "The real loopsters are dwelling in cyberspace, leeching off large computers like those slimy crater-dwelling things in *The Empire Strikes Back*."

"Mynocks!," I explode, marvelling that my non-hypertext cranial storage facility still worked. "How the Flanders did I remember that?"

"You are more fault tolerant than a Wang VS, my friend. But getting back to my point, I must confess to being a convert. I thought that book I wrote on the Hell's Angels covered the field of freakdom pretty prodigiously. But some of the loops I have encountered on the Internet hell, I am glad they are wielding keyboards and not sawn offs," he said, massaging his latterly thinning scalp.

The man who once inspired terror in portable typewriters has even acquired a laptop. A very robust model, I need not point out. Fitted with the latest PCMCIA gadgetry (he rejected my counsel on the CIA-inspired peering behind this gear in terms not fit to sully these glossy pages) so that Rolling Stones' most famous son need never be uncommunicated. Much to his copy editor's relief. In fact, on reflection this may not be true, given Dr Thompson's newly discovered passion for e-mail mixed with his nitroglycerine vitriol.

Captivated as he is by

cyberfreaks, it should come as no surprise that the prolific ramblar has almost finished a manuscript on the topic: Fear and Loathing in Cyberspace. On the final night of my visit to his rancho relaxo, I managed to get him comatose after telnetting to an Armenian community centre and trying to convince everyone on Internet Relay Chat there that he was the Devil. As he slobbered prone on his keyboard I stole a glance at his draft:

We were somewhere around barstow.edu on the edge of the Internet when the virus began to take hold. I remember saying something like: "I feel a bit lightheaded; maybe you should type. . ." And suddenly there was a terrible roar from my modem and the screen was full of what looked like huge flying toasters, all swooping and diving around the PC, which was SLUpping about a million bits a second with full duplexing to the Las Vegas MUD. And a voice was screaming: "Holy Jesus! What are these goddamn viruses?"

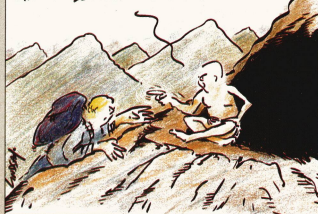
It sounds awfully familiar, but I just cannot place it.

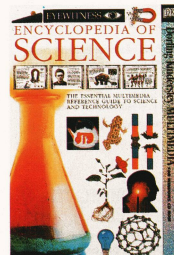
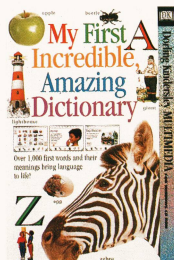
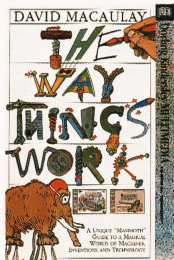
H J SIMPSON

H J Simpson is a lunatic fringe freelance computer journalist working out of almost all States of America for short periods while being pursued by the IRS over income tax related charges. He was last seen in a dank Beatnik bar on a side-street in Custer, South Dakota.

* For contractual reasons his use of the author's first name has been deleted. Ed.

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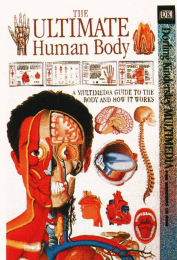
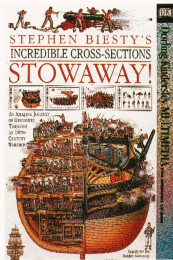


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